Vol. 1081 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

August 4, 1987

U.S.
DEPARTMENT
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Patent
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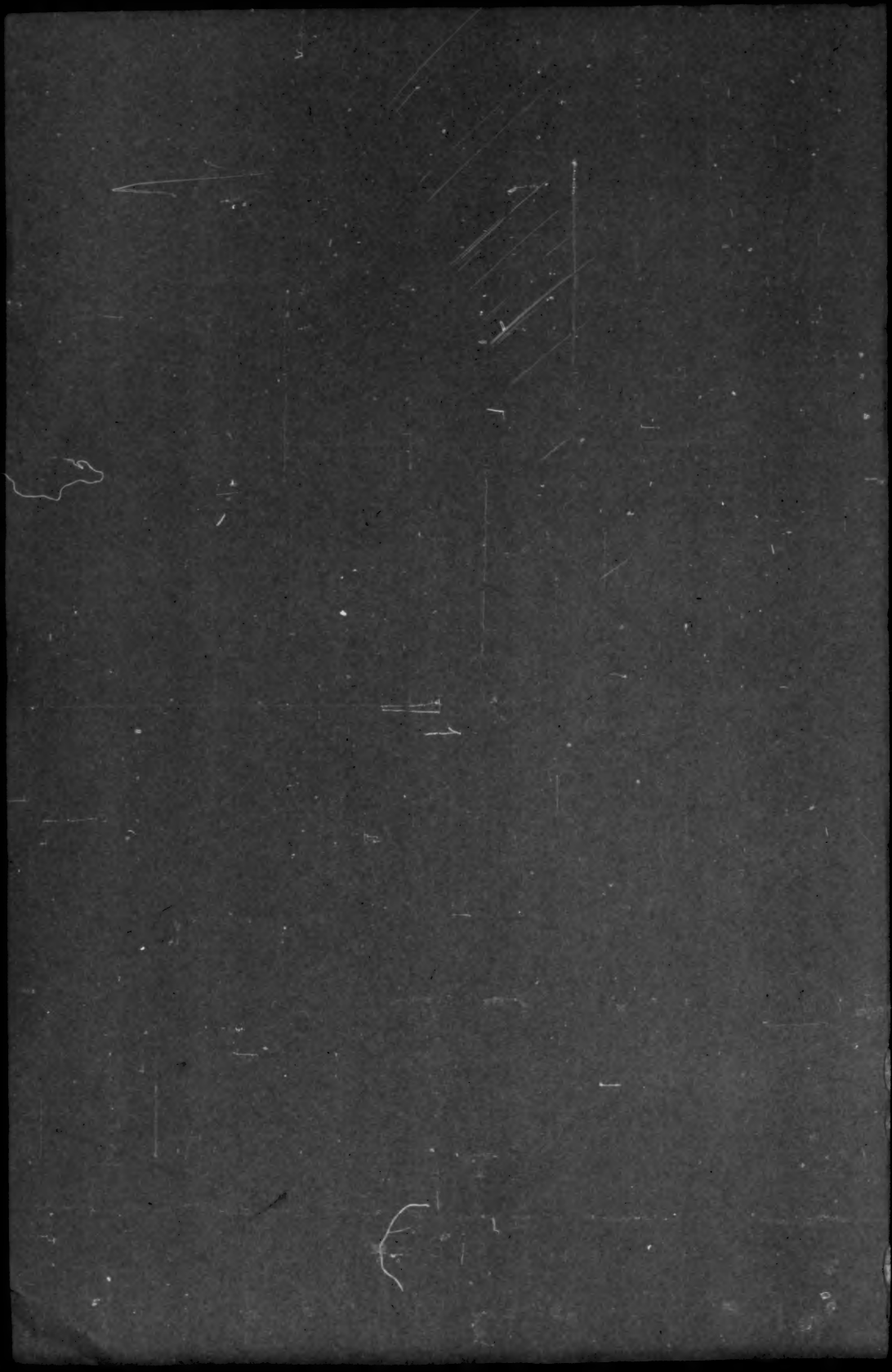

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

August 4, 1987 Volume 1081 Number 1

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1081 OG 2
Status of Appeal Cases	1081 OG 2
Notice of Maintenance Fees Payable	1081 OG 3
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1081 OG 3
Reissue Applications Filed	1081 OG 4
Requests for Reexaminations Filed	1081 OG 4
Service by Publication	1081 OG 5
Loss of Patent Rights Due to Failure to Timely Respond During Reexamination	1081 OG 5
Patent Certificates of Correction	1081 OG 7
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1081 OG 8
Condition of Patent Applications	1081 OG 9
Reexaminations	1
Statutory Invention Registrations	5
Reissue Patents Granted (32,467)	9
Patents Granted	
General and Mechanical (4,683,592)	11
Chemical (4,684,371)	283
Electrical (4,684,761)	397
Design Patents Granted (291,140)	539
Index of Patentees	PI 1
Indices of Reissue, Reexamination, Design and Statutory Invention Registrations	PI 58
Classification of	
Patents (Including Reissues and Reexaminations)	PI 63
Designs and Statutory Invention Registration Applications	PI 66
Geographical Index of Residence of Inventors	
Patents (Including Reissues and Reexaminations)	PI 67
Designs and Statutory Invention Registration Applications	PI 69
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
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COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

June 2, 1987.

Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeal Awaiting Decision Without Hearing as of June 30, 1987

Chemical Discipline	–	April 9, 1986
Mechanical Discipline	–	October 12, 1984
Electrical Discipline	–	March 4, 1985

The Date of Examiner's Answer of Oldest Appeal Awaiting Hearing as of June 30, 1987

Chemical	–	May 6, 1985
Electrical	–	November 6, 1984
Mechanical	–	October 7, 1984

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of June 1987

Affirmed	237
Affirmed-in-Part	38
Reversed	136
Total Decided	411

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on July 31, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,462,115 through 4,463,454
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:
By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:
By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MAY 17, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,383,336	06/298,578	5/17/83
4,383,348	06/313,391	5/17/83
4,383,365	06/269,269	5/17/83
4,383,368	06/303,918	5/17/83
4,383,371	06/344,003	5/17/83
4,383,381	06/281,986	5/17/83
4,383,385	06/253,870	5/17/83
4,383,388	06/244,403	5/17/83
4,383,395	06/275,551	5/17/83
4,383,399	06/254,927	5/17/83
4,383,401	06/316,745	5/17/83
4,383,415	06/292,341	5/17/83
4,383,422	06/326,855	5/17/83
4,383,423	06/247,735	5/17/83
4,383,425	06/256,943	5/17/83
4,383,430	06/218,407	5/17/83
4,383,435	06/261,956	5/17/83
4,383,446	06/248,601	5/17/83
4,383,447	06/224,188	5/17/83
4,383,457	06/220,991	5/17/83
4,383,459	06/275,692	5/17/83
4,383,460	06/277,873	5/17/83
4,383,464	06/367,392	5/17/83
4,383,467	06/278,877	5/17/83
4,383,471	06/241,915	5/17/83
4,383,472	06/318,890	5/17/83
4,383,511	06/231,419	5/17/83
4,383.517	06/263,590	5/17/83
4,383,521	06/325,839	5/17/83
4,383,542	06/263,874	5/17/83
4,383,543	06/228,108	5/17/83
4,383,548	06/335,926	5/17/83
4,383,561	06/251,131	5/17/83
4,383,565	06/230,513	5/17/83
4,383,570	06/407,635	5/17/83
4,383,575	06/260,309	5/17/83
4,383,579	06/379,464	5/17/83
4,383,583	06/346,409	5/17/83
4,383,588	06/238,447	5/17/83
4,383,592	06/247,359	5/17/83
4,383,598	06/335,177	5/17/83
4,383,607	06/334,517	5/17/83
4,383,609	06/326,871	5/17/83
4,383,613	06/304,302	5/17/83
4,383,617	06/240,280	5/17/83
4,383,621	06/279,159	5/17/83
4,383,623	06/244,672	5/17/83
4,383,628	06/245,178	5/17/83
4,383,630	06/246,409	5/17/83
4,383,631	06/260,403	5/17/83
4,383,639	06/273,609	5/17/83
4,383,640	06/330,520	5/17/83
4,383,641	06/279,387	5/17/83
4,383,643	06/276,025	5/17/83
4,383,656	06/309,226	5/17/83
4,383,669	06/243,638	5/17/83
4,383,684	06/235,020	5/17/83
4,383,685	06/340,365	5/17/83
4,383,687	06/325,938	5/17/83
4,383,688	06/227,578	5/17/83
4,383,689	06/272,098	5/17/83

Patent Number	Serial Number	Issue Date
4,383,692	06/269,680	5/17/83
4,383,695	06/238,912	5/17/83
4,383,696	06/310,865	5/17/83
4,383,697	06/241,292	5/17/83
4,383,698	06/247,398	5/17/83
4,383,710	06/271,442	5/17/83
4,383,712	06/375,332	5/17/83
4,383,739	06/320,644	5/17/83
4,383,744	06/251,830	5/17/83
4,383,751	06/315,283	5/17/83
4,383,764	06/262,897	5/17/83
4,383,771	06/315,971	5/17/83
4,383,776	06/224,828	5/17/83
4,383,778	06/260,805	5/17/83
4,383,779	06/264,666	5/17/83
4,383,780	06/313,782	5/17/83
4,383,788	06/230,365	5/17/83
4,383,794	06/311,625	5/17/83
4,383,804	06/240,016	5/17/83
4,383,821	06/236,561	5/17/83
4,383,823	06/273,089	5/17/83
4,383,825	06/303,176	5/17/83
4,383,833	06/355,758	5/17/83
4,383,834	06/350,143	5/17/83
4,383,849	06/315,981	5/17/83
4,383,860	06/274,311	5/17/83
4,383,862	06/310,940	5/17/83
4,383,876	06/295,323	5/17/83
4,383,891	06/241,034	5/17/83
4,383,901	06/255,361	5/17/83
4,383,912	06/269,675	5/17/83
4,383,917	06/280,591	5/17/83
4,383,919	06/241,804	5/17/83
4,383,938	06/254,646	5/17/83
4,383,939	06/343,247	5/17/83
4,383,955	06/295,609	5/17/83
4,383,956	06/230,132	5/17/83
4,383,960	06/270,228	5/17/83
4,383,964	06/247,276	5/17/83
4,383,990	06/303,827	5/17/83
4,383,994	06/340,712	5/17/83
4,383,995	06/318,179	5/17/83
4,384,002	06/261,904	5/17/83
4,384,007	06/391,593	5/17/83
4,384,043	06/298,674	5/17/83
4,384,054	06/307,627	5/17/83
4,384,056	06/258,285	5/17/83
4,384,062	06/329,630	5/17/83
4,384,094	06/313,731	5/17/83
4,384,108	06/276,329	5/17/83
4,384,114	06/320,622	5/17/83
4,384,118	06/273,444	5/17/83
4,384,122	06/278,641	5/17/83
4,384,126	06/348,469	5/17/83
4,384,140	06/348,724	5/17/83
4,384,156	06/355,177	5/17/83
4,384,172	06/267,873	5/17/83
4,384,184	06/303,391	5/17/83
4,384,186	06/285,996	5/17/83
4,384,191	06/322,085	5/17/83
4,384,233	06/243,392	5/17/83
4,384,269	06/244,884	5/17/83
4,384,294	06/259,691	5/17/83
4,384,302	06/278,449	5/17/83
4,384,311	06/310,747	5/17/83
4,384,344	06/332,784	5/17/83
4,384,356	06/250,859	5/17/83
4,384,357	06/250,757	5/17/83

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,456,981, Re. S.N. 878,866, Filed June 26, 1986, Cl. 365/234, MODULATION SYSTEM FOR OPTICAL RECORDING, Dorrel R. Silvy, et al., Owner of Record: *Magnetic Peripehals, Inc., Bloomington, Minn.,* Attorney or Agent: Joseph A. Genoves, Ex. Gp.: 233

4,522,876, Re. S.N. 060,400, Filed June 10, 1987, Cl. 428/285, INTEGRAL TEXTILE COMPOSITE FABRIC, John J. Hiers, Owner of Record: *Lydall, Inc., Manchester, Conn.,* Attorney or Agent: Robert B. Murray, et al., Ex. Gp.: 154

4,524,440, Re. S.N. 059,713, Filed June 8, 1987, Cl. 370/54, FAST CIRCUIT SWITCHING SYSTEM, Milo Orsic, Owner of Record: *Bell Telephone Laboratories, Inc., Murray Hill, N.J.,* Attorney or Agent: John P. McDonnell, et al., Ex. Gp.: 263

4,654,039, Re. S.N. 060,718, Filed June 10, 1987, Cl. 604/368, HYDROGEL-FORMING POLYMER COMPOSITIONS FOR USE IN ABSORBENT STRUCTURES, Kerryn A. Brandt, et al., Owner of Record: *Procter & Gamble Co., Cincinnati, Ohio,* Attorney or Agent: Richard C. Witte, et al., Ex. Gp.: 336

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

3,859,575, Reexam. No. 90/001,260, Requested: June 5, 1987, Cl. 361/283, VARIABLE CAPACITANCE SENSOR, Shih-Ying Lee, et al., Owner of Record: *Shih-Ying Lee & Yao-Tzu Li, Acton, Mass.,* Attorney or Agent: Unknown, Ex. Gp.: 210, Requester: Rosemount, Inc. Minnapolis, Minn.

4,001,550, Reexam. No. 90/001,257, Requested: June 15, 1987, Cl. 235/379, UNIVERSAL FUNDS TRANSFER AND IDENTIFICATION CARD, Vernon L. Schatz, Owner of Record: *Distributed Intelligence Acess Systems, Corp., Washington, D.C.,* Attorney or Agent: Leydig, Voit, et al., Ex. Gp.: 230, Requester: Kerkam, Stowell, et al., Falls Church, Va.

4,330,280, Reexam. No. 90/001,258, Requested: June 1, 1987, Cl. 433/090, EJECTOR HOLDER FOR CAPSULE-LIKE CARTRIDGE, Emery W. Dougherty, et al., Owner of Record: *Dentsply Research & Development Corp., Milford, Del.,* Attorney or Agent: C. Hercus Just, Ex. Gp.: 330, Requester: Dr. W. B. Dragan, Milford, Conn.

4,343,480, Reexam. No. 90/001,264, Requested: June 18, 1987, Cl. 277/207A, PIPE BELL AND GASKET, Efrain D. Vassallo, Owner of Record: *Industrias Vassallo, Inc., Ponce, Puerto Rico,* Attorney or Agent: K. L. Spivak, Ex. Gp.: 240, Requester: Multi Fittings Corp., Port Huron, Mich.

4,346,376, Reexam. No. 90/001,252, Requested: June 1, 1987, Cl. 340/12, TOUCH POSITION SENSITIVE SURFACE, James B. Mallos, Owner of Record: *AT&T Bell Laboratories, Murray Hill, N.J.,* Attorney or Agent: J. P. McDonnell, Ex. Gp.: 260, Requester: Owner

4,420,657, Reexam. No. 90/001,263, Requested: June 15, 1987, Cl. 179/156A, ADJUSTABLE HEADSET,

Wallace K. Larkin, Owner of Record: *ACS Communications, Inc., Scotts Valley, Calif.*, Attorney or Agent: M. A. Stallman, Ex. Gp.: 260, Requester: Owner

4,425,426, Reexam. No. 90/001,255, Requested: June 8, 1987, Cl. 430/281, RADIOGRAPHIC ELEMENTS EXHIBITING REDUCED CROSSOVER, Thomas Abbott, et al., Owner of Record: *Eastman Kodak Co., Rochester, N.Y.*, Attorney or Agent: J. G. Levitt, Ex. Gp.: 150, Requester: E. I. Du Pont de Nemours & Co., Wilmington, Del.

4,427,953, Reexam. No. 90/001,256, Requested: June 9, 1987, Cl. 333/134, MICROWAVE DIPLEXER, Thomas Hudspeth, Owner of Record: *Hughes Aircraft, Los Angeles, Calif.*, Attorney or Agent: Unknown, Ex. Gp.: 250, Requester: Owner

4,484,179, Reexam. No. 90/001,251, Requested: June 1, 1987, Cl. 340/365P, TOUCH POSITION SENSITIVE SURFACE, Leonard R. Kasday, Owner of Record: *AT&T Bell Laboratories, Murray Hill, N.J.*, Attorney or Agent: J. P. McDonnell, Ex. Gp.: 230, Requester: Owner

4,506,222, Reexam. No. 90/001,253, Requested: June 4, 1987, Cl. 324/309, METHODS OF PRODUCING IMAGE INFORMATION FROM OBJECTS, William A. Edelstein, et al., Owner of Record: *National Research Development Corp., London, England,* Attorney or Agent: Cushman, Darby, et al., Ex. Gp.: 260, Requester: Owner

4,562,136, Reexam. No. 90/001,250, Requested: June 1, 1987, Cl. 430/107, TONER FOR DEVELOPMENT OF LATENT ELECTROSTATIC IMAGES, Satoru Inoue, Owner of Record: *Ricoh Co., Ltd., Tokyo, Japan,* Attorney or Agent: Unknown, Ex. Gp.: 150, Requester: Owner

4,578,199, Reexam. No. 90/001,261, Requested: June 15, 1987, Cl. 210/788, CYCLONE SEPARATORS, John D. Peel, et al., Owner of Record: *Beloit Corp., Beloit, Wis.*, Attorney or Agent: Gerald A. Matthews, Ex. Gp.: 130, Requester: Owner

4,587,458, Reexam. No. 90/001,259, Requested: June 5, 1987, Cl. 315/111.10, CONTROLLING CURRENT DENSITY, John Davenport, et al., Owner of Record: *Ti (Group Services) Ltd., Birmingham, England,* Attorney or Agent: S. B. Kemon, Ex. Gp.: 260, Requester: Owner

4,599,115, Reexam. No. 90/001,262, Requested: June 15, 1987 Cl. 127/46.100, METHOD FOR CONTROLLING SIMULATED MOVING BED SYSTEM, Masao Ando, et al., Owner of Record: *Mitsubishi-Kasei Technoengineers, Tokyo, Japan,* Attorney or Agent: Sughrue, Mion, et al., Ex. Gp.: 130, Requester: The Amalgamated Sugar Co., Ogden, Utah

4,621,043, Reexam. No. 90/001,254, Requested: June 5, 1987, Cl. 430/502, STORAGE STABLE PHOTOPOLYMERIZABLE COMPOSITION, Joseph E. Gervay, Owner of Record: *E. I. Du Pont de Nemours & Co., Wilmington, Del.* Attorney or Agent: Andrew G. Golian, Ex. Gp.: 150, Requester: Owner

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Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representative, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Caisson Equities, Inc., Santa Barbara, Calif., Reg. No. 1,042,081 for the mark "COUNTY FAIR", Canc. No. 15,851.

Sneaker, Granada Hills, Calif., Reg. No. 1,167,732, for the mark "SNEAKER", Canc. No. 15,932.

Pixel Computer, Inc., Wilmington, Mass., Reg. No. 1,249,713, for the mark "PIXEL 100/AP", Canc. No. 15,975.

ERMA S. BROWN,
Administrator
of the Trademark Trial
and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner
for Trademarks.

Loss of Patent Rights Due to Failure to Timely Respond During Reexamination

This notice is intended to remind patent owners and patent practitioners that patent rights can be, and have been, lost as a result of the failure to timely respond to an Office action, or meet a time deadline, in a reexamination proceeding. Failure to timely respond, meet a time deadline, or timely request an extension of time results in termination of a reexamination proceeding under 37 CFR 1.550(d) and issuance of a reexamination certificate under 37 CFR 1.570 in accordance with the last action of the Office. Neither the statute nor the rules provide for reviving the terminated proceeding. A certificate must issue.

Practitioners are reminded that requests for an extension of time in a reexamination proceeding must be filed under 37 CFR 1.550(c) with an appropriate justification and not by payment of an extension of time fee under 37 CFR 1.136(a). Further, such requests must be filed on or before the day on which the response is due.

The statute requires that reexamination be conducted with special dispatch. Accordingly, such proceedings are treated "special" throughout the PTO including the setting of two month shortened statutory periods for response to Office actions wherein extensions of time are controlled by the Office under §1.550(c) and not by the patent owner under §1.136(a). Further, special monitoring of reexamination is regularly conducted *throughout* the Office to insure timeliness. Applications are separately tracked and monitored in the PTO's PALM (Patent Application Locating and Monitoring) system. Particularly attention is given to newly filed requests to insure that the determination on whether or not to order reexamination is mailed within the three month statutory deadline. The reexamination file wrapper is quickly compiled and forwarded to the examining group within one month of the filing of the request for reexamination by a special Reexamination Preprocessing Unit located in the Application Branch. For ease of identification, reexamination files have a special and unique "control number" identification numbering system separate and apart from the regular "serial number" series used for regular patent applications. The reexamination files are bright orange in color to insure that they are not "lost in the crowd" of regular application files. The reexamination files are stored together in each examining group separate and apart from regular applications. A special printing cycle for accelerated publication of the reexamination certificate is utilized.

It has become apparent that many practitioners have not read the rules or if they have read the rules they have been unwilling to appreciate the significance of the special dispatch requirement of the statute and the intent of the regulations implementing that special dispatch. As

noted above, appropriate rules have been drafted and extraordinary steps have been taken within the PTO to implement the special dispatch requirement. In contrast, as evidenced by recent petitions in reexamination proceedings, it appears that some practitioners have not adopted appropriate and necessary special docketing and operating procedures to insure proper and timely compliance with the special dispatch requirement and the regulations adopted for its implementation. It is expected that practitioners will take the steps necessary to provide appropriate in-house special docketing and operating procedures which earmark reexamination cases as different and apart from regular applications. These steps should be taken to insure timely response in reexamination proceedings and to prevent the loss of patent rights. The existence or non-existence of such steps and the manner in which any steps are implemented will be a significant consideration in reviewing any petition requesting a waiver of the rules to accept a late response in a reexamination proceeding.

The public is hereby put on notice that the rules relating to timely response and extension of time practice in reexamination proceedings will be *strictly enforced* in the future.

DONALD J. QUIGG,
July 10, 1987 *Commissioner of Patents and Trademarks.*

PATENT NOTICES

Certificates of Correction for the Week of Aug. 4, 1987

4,420,787	4,629,692	4,649,911	4,657,704
4,499,286	4,630,318	4,650,981	4,657,789
4,514,734	4,630,992	4,651,142	4,657,965
4,526,442	4,631,269	4,651,173	4,658,051
4,546,737	4,632,418	4,651,266	4,658,229
4,548,724	4,632,988	4,652,652	4,658,272
4,551,792	4,633,118	4,652,667	4,658,517
4,577,992	4,634,233	4,652,941	4,658,859
4,582,051	4,634,876	4,653,065	4,659,069
4,582,628	4,635,746	4,654,113	4,659,144
4,588,873	4,636,062	4,654,514	4,659,192
4,589,754	4,636,565	4,654,688	4,659,854
4,589,839	4,637,254	4,655,031	4,659,863
4,593,028	4,637,953	4,655,059	4,659,944
4,594,539	4,638,082	4,655,516	4,660,209
4,595,599	4,638,601	4,655,610	4,660,244
4,603,966	4,638,796	4,655,834	4,660,718
4,604,397	4,639,201	4,656,019	4,660,812
4,608,025	4,639,468	4,656,042	4,660,822
4,614,957	4,642,017	4,656,634	4,661,163
4,615,973	4,642,188	4,656,743	4,661,467
4,619,588	4,642,874	4,656,760	4,661,518
4,619,741	4,644,147	4,656,941	4,661,906
4,621,782	4,644,168	4,656,948	4,662,631
4,625,020	4,646,264	4,657,021	4,663,502
4,625,101	4,647,465	4,657,082	4,663,549
4,625,231	4,647,662	4,657,122	4,663,793
4,625,761	4,648,717	4,657,219	4,664,368
4,627,338	4,649,261	4,657,464	4,664,782
4,628,805	4,649,903	4,657,530	

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 264-4481
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7609
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Irvine: University of California, Irvine Library	(714) 856-7234
	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2122
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1741
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4284
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia: Free Library	(215) 686-5330
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas.	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

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*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF July 4, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	4-10-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-30-86
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-23-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	1-30-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	9-07-84
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	11-4-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	4-30-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	6-13-85
DESIGN, GROUP 290—K. L. CAGE, Director	1-14-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-12-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	1-31-86
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	10-01-86

Expiration of patents: The patents within the range of numbers indicated below expire during July 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents . . . . . Numbers 3,518,701 to 3,522,400, inclusive

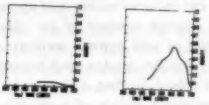
Plant Patents . . . . . Numbers 2,977 to 2,985 inclusive

REEXAMINATIONS

AUGUST 4, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,900,669 (735th)
PRESSURE-SENSITIVE RECORDING SHEET WITH MICROCAPSULES HAVING POLYUREA WALLS
Masataka Kiritani, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan
Reexamination Request No. 90/001,065, Aug. 11, 1986.
Reexamination Certificate for Patent No. 3,900,669, issued Aug. 19, 1975, Ser. No. 298,888, Oct. 19, 1972.
Claims priority, application Japan, Oct. 21, 1971, 46-83483
Int. Cl.[4] B41M *5/16*
U.S. Cl. 346—215



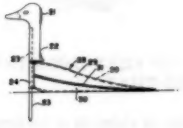
AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–22 is confirmed.

Claim 23 is cancelled.

1. A pressure-sensitive recording sheet which comprises a base material and (1) a layer of a colorless or substantially colorless color-forming substance rendered colored upon reaction with a developer, encapsulated in walls of a polyurea obtained by the reaction of a polyisocyanate or isocyanate-containing polyisocyanate adduct with a polyamine or polyamine adduct, and (2) a layer of developer capable of giving a colored substance by reaction with said color-forming substance, layers (1) and (2) being on the same surface of said base material.

B1 4,062,141 (736th)
DECOY
Jelmer B. Shjeflo, 516 N. 23 St., Bismarck, N. Dak. 58501
Reexamination Request No. 90/001,077, Aug. 28, 1986.
Reexamination Certificate for Patent No. 4,062,141, issued Dec. 13, 1977, Ser. No. 736,148, Oct. 27, 1976.
Int. Cl.[4] A01M *31/06*
U.S. Cl. 43—3



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim 1 is confirmed.

1. A decoy comprising a head portion having a neck portion therebeneath and made of relatively rigid material, a hoop member attached to the bottom of the neck portion and extending downward therefrom, a spike attached to the bottom of the hoop and projecting downward therefrom, said spike being adapted to be inserted into the ground, said head and neck portions simulating the head of a water fowl, a flexible bag having a wind sock construction with an opening at the front end with the edges of the bag adjacent the opening fixed to the hoop to keep and maintain the opening in an open condition, the bag having flared out center portions, a tapered rearward portion, whereby when the decoy is positioned so that the opening in the bag is facing into the wind, the wind will inflate the bag so that the bag will give the appearance of the body of a water fowl with the flared out center portions giving the appearance of the folded wings of the decoy, and the tapered rearward portion giving the appearance of the tail of the water fowl.

B1 4,226,728 (737th)
FIRE EXTINGUISHER AND FIRE EXTINGUISHING COMPOSITION
Shiu H. Kung, Bayside, N.Y., assignor to Pat Evans, Cleveland, Tenn.
Reexamination Request No. 90/000,698, Dec. 21, 1984.
Reexamination Certificate for Patent No. 4,226,728, issued Oct. 7, 1980, Ser. No. 906,409, May 16, 1978.
Int. Cl.[4] A62D *1/00*
U.S. Cl. 252—8

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Table 1 located at column 1, lines 54–64:

TABLE I

VAPOR PRESSURE OF HALONE (at 70° F.)		
High Vapor Pressure Halons		
Chlorotrifluoromethane	(473.4 psig)	(Halon 13)
Bromotrifluoromethane	(213.7 psig)	[(Halon 1202)] *(Halon 1301)*
Chloropentafluoroethane	(119.1 psig)	(Halon 215)
Low Vapor Pressure Halons		
Trichlorofluoromethane	(13.345 psig)	(Halon 11)
Dibromodifluoromethane	(27.6 psig)	(Halon 1202)
Bromochlorodifluoromethane	(22.7 psig)	(Halon 1211)
1,2-dibromotetrafluoroethane	(3.8 psig at 130° F.)	(Halon 2402)

Claims 1–8 are cancelled.

[1. An improved extinguishing compound for use in low pressure, aerosol fire extinguishers consisting of between about 10 and 90% of a low vapor pressure halogenated alkane selected from the group consisting of trichlorofluoromethane, dibromodifluoromethane, bormochlorodifluoromethane and 1,2-dibromotetrafluoroethane and between about 4 and 96% of a high vapor pressure halogenated alkane selected from the group consisting of, bromotrifluoromethane, and chloropentafluoroethane, all of said percentages being by weight of the extinguishing compound.]

B1 4,391,949 (738th)

ASYMMETRIC BLOCK COPOLYMERS AND CORRESPONDING ADHESIVE FORMULATIONS

David J. St. Clair, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Reexamination Request No. 90/001,014, May 23, 1986.
Reexamination Certificate for Patent No. 4,391,949, issued Jul. 5, 1983, Ser. No. 320,233, Nov. 12, 1981.
Int. Cl.[4] C08L *9/00;* **C08F** *293/00*
U.S. Cl. 525—99

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–17** are now disclaimed.

~~[~~

~~1. A block copolymer having the star-shaped, asymmetrical structure~~

~~$(A—B)_x Y-(-C)_z$~~

~~where A is a polymer block of a monoalkenyl arene, B is a polymer block of a conjugated diene, C is a polymer block of a conjugated diene, Y is the residue of a multifunctional coupling agent, the sum of x plus z is greater than 6 and less than about 25, the ratio of x to z is between about 5 to 1 and about 1 to 5, the molecular weight of each block A is between about 3,000 and about 30,000, the molecular weight of each block B is between about 15,000 and about 100,000, and the molecular weight of each block C is between about 15,000 and about 100,000.~~ **]**

B1 4,451,996 (739th)

ATHLETIC SHOE WITH COLLAR

Edward J. Norton, Kingston; Paul Oparowski, Derry, and Alphonse L. Belavitch, Salem, all of N.H., assignors to New Balance Athletic Shoe, Inc., Boston, Mass.

Reexamination Request No. 90/000,689, Dec. 18, 1984.
Reexamination Certificate for Patent No. 4,451,996, issued Jun. 5, 1984, Ser. No. 360,663, Mar. 22, 1982.
Int. Cl.[4] A43B *5/00, 19/00*
U.S. Cl. 36—129

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–5** and **7–9** are cancelled.

Claim **6** is determined to be patentable as amended.

New claims **10** and **11** are added and determined to be patentable.

6. The footwear of claim **[5]** *11* including a plurality of eyelets extending along confronting edges of said instep sections adapted to receive a lace for securing said footwear in use, and wherein said foam material lamina cushions and supports the lower leg above the ankles.

10. Footwear in the form of an athletic shoe including a sole assembly and an upper connected to said sole assembly, said upper having a pair of instep sections and quarter sections which extend over the foot above the region of the ankle, said athletic shoe characterized by a cut out area within said upper, below a binding at the top of the quarter sections of the shoe and completely through the material of said quarter sections, said cut out area extending over the Achilles tendon and toward and around the ankle bone on each side of the foot, a closure for said cut out area, said closure comprising a collar of cushioning material which embraces, supports and protects the ankle bones as well as to provide a measure of pliability greater than that of the material within the portion of said upper which completely surrounds the cut out area to substantially eliminate any potential pressure points within said cut out area, said collar being of laminated construction including a high density foam material lamina and an outer cover lamina, and a layer of facing material comprising an inner lamina, said facing material secured to the inner surface at least of said quarter sections.

11. Footwear in the form of an athletic shoe including a sole assembly and an upper connected to said sole assembly, said upper having a pair of instep sections and quarter sections which extend over the foot above the region of the ankle, said athletic shoe characterized by a cut out area within said upper, below a binding at the top of the quarter sections of the shoe and completely through the material of said quarter sections, said cut out area extending over the Achilles tendon and toward and around the ankle bone on each side of the foot, a closure for said cut out area, said closure comprising a collar of cushioning material which embraces, supports and protects the ankle bones as well as to provide a measure of pliability greater than that of the material within the portion of said upper which completely surrounds the cut out area to substantially eliminate any potential pressure points within said cut out area, said collar being of laminated construction including a high density polyurethane foam material lamina of about one-quarter inch thickness, and an outer cover lamina of vinyl sheet, and wherein said high density polyurethane foam material lamina extends substantially within the quarter portions upper region.

B1 4,462,708 (740th)

AUTOMATED TAPE LETTERING MACHINE

Cleto R. Luartes, Burnsville, and William H. Powell, Jr., Stillwater, both of Minn., assignors to Kroy Inc., Scottsdale, Ariz.

Reexamination Request Nos. 90/000,966, Mar. 7, 1986 and 90/001,029, Jun. 6, 1986.
Reexamination Certificate for Patent No. 4,462,708, issued Jul. 31, 1984, Ser. No. 252,699, Apr. 8, 1981.
Int. Cl.[4] B41J *1/30, 3/30*
U.S. Cl. 400—304

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim **20** is confirmed.

Claims **1, 2, 5, 6, 14, 15, 19, 22, 24, 25, 27, 28, 30, 31,** and **34–36** are determined to be patentable as amended.

Claims **3, 4, 7–13, 16–18, 21, 23, 26, 29, 32,** and **33,** dependent on an amended claim, are determined to be patentable.

1. In a tape lettering or printing apparatus for lettering or printing characters [on a] *longitudinally along a strip of* tape comprising a *stationary* tape printing station, a *rigid unitary* circular rotatable font for providing a raised character in printing alignment at the tape printing station and means for printing characters on the tape in a tape print cycle, including a means for providing a color carrying ribbon and image carrying tape *of substantially the same width* at the tape printing station, a means for advancing the ribbon and tape *for intercharacter spacing* in alignment with the tape printing station, and a force generating means for exerting a *high pressure* printing force to print characters on the tape at the tape printing station, and wherein the means for printing characters on the tape further comprises a print motor for operating the tape printing apparatus during the tape print cycle, the improvement comprising:

processing means for receiving input data to be printed on the tape and for supplying control signals to the tape printing apparatus to *control the printing of characters on the tape and* cause the tape printing apparatus to print the input data on the tape;

data input means connected to the processing means for *manually* entering input data and transmitting the data in encoded form to the processing means so that the data can be sequentially printed on the tape;

a character positioning motor, operatively connected to the circular rotatable font, for rotating the circular font to provide a raised character at the tape printing station;

character positioning motor control means for causing, in response to [receipt of] control signals from the processing means, the character positioning motor to rotate and position the font from its present position to a selected character position so that a selected character to be printed on the tape is presented at the tape printing station;

means for deenergizing the character positioning motor prior to aligning the character to be printed on the tape;

print motor control means for causing, in response to control signals from the processing means, the tape print cycle to occur so that the color carrying ribbon and image carrying tape are provided at the tape printing station, the selected character to be printed on the tape is aligned for printing and a printing force is exerted against the color carrying ribbon, the tape and the character on the circular font at the tape printing station so that an image of the character is transferred from the color carrying ribbon to the image carrying tape; and

means enabling the simultaneous *and continuous* entry and printing of data and permitting the rate of *manual* data entry to exceed the rate of *tape* printing, said enabling means including the processing means which comprises:

a multiple character input buffer for receiving *and storing* coded data from the input means at the *manual input* data rate of the input means;

a programmed microcomputer for *continuously and* sequentially decoding the data in the input buffer and for calculating the amount of rotation of the circular rotatable font necessary to sequentially print each successive character on the tape;

an output buffer connected to and controlled by the programmed microcomputer and connected to control with control signals the character positioning motor through the character positioning motor control means and the print motor through the print motor control means in the sequence programmed into the microcomputer so that each character on the circular rotatable font corresponding to a character entered by the data input means is sequentially positioned at the tape printing station and a tape print cycle is initiated and concluded for each character so that data can be printed on the tape at the printing rate of the tape printing apparatus and subsequent data can be simultaneously entered into said input buffer; and

wherein the character positioning motor control means and the print motor control means each comprise means for converting the logic level signals of the processing means into power level signals sufficient to operate the character positioning motor and the print motor, respectively.

STATUTORY INVENTION REGISTRATIONS

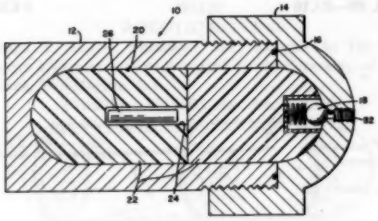
PUBLISHED AUGUST 4, 1987

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

H314
SAFETY CONTAINER FOR TRANSPORTING SMALL QUANTITIES OF EXPLOSIVES

Robert E. Betts, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 18, 1986, Ser. No. 1,943
Int. Cl.[4] B65D *81/02, 85/30*
U.S. Cl. 206—523 **4 Claims**



1. A safety container for transporting small quantities of explosive and comprising a high strength metal bottle having a bottom section and a top cap section with said sections being removably secured together and sealing means sealing between the bottom section and the cap section, a cavity defined in said bottle and a rigid foam material mounted in said bottle and filling said cavity, said foam material having a cavity at approximately the geometric center of the foam material for containing a small container of explosive therein, and said cap having a relief valve means therein for relieving any pressures that may be formed inside the bottle, said rigid foam material being of such a material that when fully compressed it occupies no more than 5 percent of the volume of the cavity in the metal bottle.

H315
METHOD OF MEASURING OPTICAL PROPERTIES OF A TRANSPARENCY

Louis V. Genco, Enon, and Harry L. Task, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 4, 1984, Ser. No. 607,090
Int. Cl.[4] G01B *9/00*
U.S. Cl. 356—125 **5 Claims**

1. A method of measuring spherical optical power of a transparency, comprising the steps of:

(a) providing a substantially point source of light;

(b) collimating light from said source and projecting the light so collimated along an optical axis from said source through a test region defined along said axis;

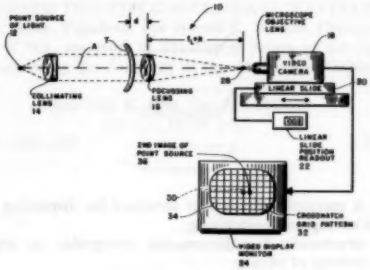
(c) receiving collimated light at a predetermined first location along said optical axis after the collimated light passes through said test region and focusing said collimated light to produce a first point image of said source at a first distance "f_L" from said first location, and measuring "f_L";

(d) disposing a video camera at a first position along said optical axis and focusing said camera on said first point image;

(e) placing a transparency within said test region and along said optical axis at a second location between said source and said first location, said second location being displaced from said first location by a predetermined distance "d";

(f) receiving collimated light at said first location along said optical axis after the collimated light passes through said transparency and test region and producing a second point image of said source;

(g) moving said video camera along said optical axis to a second position and focusing said camera on said second point image;



(h) measuring the distance "R" between said first position and said second position of said video camera; and

(i) calculating the spherical optical power of said transparency by solving for ϕ_r where

$$\phi_r = \frac{\frac{1}{(f_L + R)} - \frac{1}{f_L}}{1 - \frac{d}{f_L}}.$$

H316
HYDROCARBON DRAG REDUCTION WITH INTERPOLYMER COMPLEXES CONTAINING NOVEL SULFO-OCTENE

Ralph M. Kowalik, Bridgewater; Joseph Wagensommer, Westfield; Ilan Duvdevani, Leonia, and Pawan K. Agarwal, Bridgewater, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

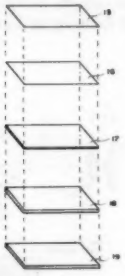
Filed May 2, 1986, Ser. No. 858,673
Int. Cl.[4] F17D *1/16, 1/18*
U.S. Cl. 137—13 **4 Claims**

1. A method for reducing the frictional drag of an organic liquid in flow through pipes or conduits having a continuous bore therethrough which comprises adding about 0.001 to about 0.5 grams of a polymeric complex to 100 ml of said organic liquid, wherein the polymeric complex is the reaction product of a metal neutralized sulfonated octene-1/ethylene/ethylidene norborene terpolymer and a basic nitrogen-containing copolymer, said basic nitrogen containing copolymer being a copolymer of vinylpyridine with another monomer selected from the group consisting of styrene, t-butyl styrene, alkylacrylate, alkylmethacrylate, butadiene, isoprene, vinyl chloride and acrylonitrile.

H317
HOLOGRAPHIC AND XOGRAPHIC MAGNETIC NOTE HOLDER STRUCTURES

Bruce W. Gladden, 6322 Dogwood Dr., Orlando, Fla. 32807

Filed Aug. 1, 1986, Ser. No. 892,791
Int. Cl.[4] G09F *19/14, 7/04*
U.S. Cl. 40—453 1 Claim

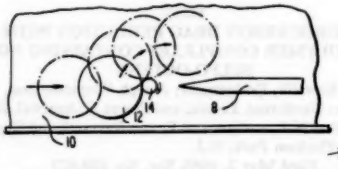


1. A magnetic note holder structure for displaying a hologram or xogram, comprising:
- a structurally two-dimensional holograhic or xographic artform of choice;
- a sheet section of clear acrylic laminate adhered to the surface of said halographic or xographic artwork of choice;
- a sheet section of stainless steel tape adhered to the underside of said holographic or xographic artwork of choice;
- a sheet section of double-sided tape adhered to the underside of said sheet section of stainless steel tape; and
- a section of rubberized, magnetized sheet adhered to the underside of said sheet section of double-sided tape.

H318
ROTARY GUIDE DEVICE

Herman D. Mims, Charlotte, N.C., assignor to Machine Builders and Design, Inc., Shelby, N.C.

Continuation of Ser. No. 406,818, Aug. 10, 1982, abandoned, which is a continuation-in-part of Ser. No. 175,480, Aug. 5, 1980, abandoned. This application Oct. 30, 1986, Ser. No. 925,506
Int. Cl.[4] B65G *47/12*
U.S. Cl. 198—446 7 Claims

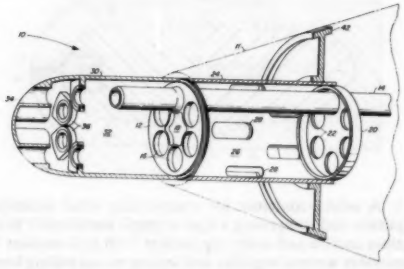


1. A guide device for alinging a plurality of substantially flat articles on a moving conveyor into a plurality of columns on the conveyor without jamming said articles, comprising; plural stationary guide plates positioned over said conveyor and extending in the direction of movement of said conveyor and defining plural unidirectional guide channels, a plurality of rotating spindles provided in spaced relation to each other and forming a series of spindles extending across said conveyor, with a spindle positioned at the upstream end of each of the guide plates in direct alignment with respective guide plates, means for rotatably supporting each spindle immediately above and adjacent to the conveyor, and drive means for rotating each spindle so as to forcibly divert an article on said moving conveyor which comes into engagement with a rotating spindle into a specific adjacent one of said guide channels, each guide channel being associated with a respecitve spindle, said guide plates having forward ends positioned along a line extending generally transversely to the direction of belt travel and defining therebetween gate widths, and said spindles being arranged upstream of the forward ends of said guides plates, and being positioned along at least one line skewed to the direction of belt travel to thereby icrease lengths of said gates, said skewed line forming an angle of 30 to 75 degrees with a line orthogonal to the direction of belt travel.

H319
GUN BLAST DIFFUSER

Arthur E. Clayson, Inyokern, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 18, 1986, Ser. No. 932,116
Int. Cl.[4] F41F *23/00*
U.S. Cl. 89—37.16 5 Claims



1. A device for directing and diffusing the muzzle blast of an aircraft mounted gun, said gun having a plurality of generally parallel barrels radially spaced, and rotatable about an axis generally parallel thereto, said barrels having forward muzzle ends and aft breech ends, the device comprising:
- a first disk positioned proximate to said muzzle ends and mounted on said barrels so as to rotate therewith, said disk having a plurality of apertures through which said barrels extend and one or more windows for passage of muzzle blast therethrough;
- a second disk positioned between said first disk and said breech ends and mounted on said barrels so as to rotate therewith, said second disk having a plurality of apertures through which said barrels extend, said second disk sealably engaging said barrels so that said muzzle blast is prevented from passing between said barrels and said second disk;
- a blast tube surrounding said barrels between said disks, said blast tube having vents opening peripherally therethrough, said blast tube sealably engaging said second disk so as to prevent the passage of said muzzle blast between said blast tube and said second disk, said blast tube and disks defining an expansion chamber through which said barrels extend;
- an arcuate shaped nose extending forwardly of said muzzle ends and mounted on said barrels for rotation therewith, said nose section sealably engaging said blast tube, said nose section defining a blast collection chamber in communication with said windows and expansion chamber;
- exit tubes mounted to said nose and extending therethrough, said exit tubes individual to said barrels for providing passageways for projectiles fired through said barrels;
- gas stripper means mounted to said nose intermediate of said exit tubes and said barrels for stripping and diverting the muzzle blast occasioned by the discharge of projectiles from said gun into said blast collection chamber of said nose;

the interaction of said stripper means, blast collection cham-

ber, windows, and blast expansion chamber being such that said muzzle blast occasioned by the discharge of projectiles from said gun are rendered innocuous to an aircraft.

H320

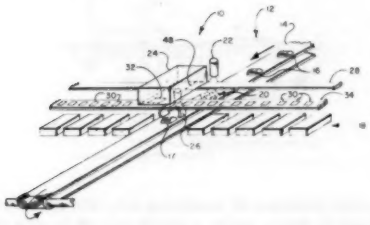
ROBOTIC KITTING

Howard A. Reuter, Pasadena, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 27, 1983, Ser. No. 488,900

Int. Cl.[4] G06F *15/20, 15/46;* **B65B** *21/02*

U.S. Cl. 364—468 **1 Claim**



1. A robotic kitting apparatus for assembling electronic parts in kits comprising:

a conveyor, said conveyor including a belt having a plurality of parts bags containing electronic parts placed on said belt, each of said parts bags having attached thereon an allocation tag with information thereon;

means for reading said information contained on said allocation tag, said means for reading being located approximate to said conveyor belt for reading said allocation tag information;

a computer, said computer being adapted to receive said allocation tag information from said means for reading, said computer programmed to control the robotic kitting apparatus;

a plurality of kit boxes, each of said kit boxes sequentially arranged in a plurality of rows perpendicular to said conveyor belt, a single means for reading being positioned before said, plurality of rows;

a plurality of means for kitting said parts bags on said conveyor belt, a number of said means for kitting being equal to the rows of kit boxes, said means for kitting being positioned downstream from said means for reading, said means for kitting transporting a selected parts bag to a designated kit box for depositing therein, one means for kitting operating on a single row of kit boxes, each of said means for kitting comprising:

a claw machine that releasably engages said selected parts bag identified by said means for reading

a drive belt attached to said claw machine for moving said claw machine over said designated kit box;

a track, said track providing a surface upon which said claw machine translates over said kit boxes; and

means for determining when to release said selected parts bag.

H321

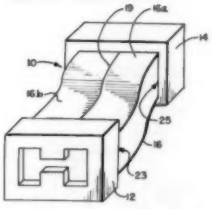
MACHINED TWO-PIECE MICROWAVE WAVEGUIDE

Marc J. Riley, Pasadena, and Harold E. Sterner, Crownsville, both of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 8, 1984, Ser. No. 587,432

Int. Cl.[4] H01P *3/00*

U.S. Cl. 333—239 **1 Claim**



1. A waveguide for connecting two waveguide ports of offset waveguides, said waveguide comprising:

a waveguide section, said waveguide section being rectangularly shaped in a transverse direction perpendicular to an energy flow and being S-bend shaped in a longitudinal direction parallel to said energy flow, said waveguide section having a first element and a second element for forming a conductive waveguide chamber, said second element being a complimentary mirror-image of said first element such that when said first and said second elements are fixedly joined by brazing said conductive waveguide chamber is formed therebetween, each of said elements being C-shaped in said transverse direction and having three walls unitarily formed with right angles in said transverse direction, said section having parallel end faces, said section being formed of a metallic material that allows the transmission of microwave energy therethrough without significant loss, said section formed to minimize voltage standing wave ratio,

a first flange plate, said first flange plate having an interior face and an exterior face, said first flange plate having means for mounting, said exterior face being mounted by said means for mounting to one of said waveguide ports, said interior face being fixedly attached to one of said end faces of said waveguide section, said interior face having a closely fitting recess therein for fixedly holding by brazing said waveguide section, said first flange plate having a port therethrough for allowing said microwave energy to pass between said waveguide section and said offset waveguides with a minimum of loss; and

a second flange plate, said second flange plate being similar to said first flange plate in shape, said second flange plate mounted to the other of said end faces of said waveguide section and to the other of said offset waveguides, each of said flange plates being essentially parallel to said waveguide ports of attachment.

H322

LASER DIODE POWER CONTROLLER

Brent S. Simons, Santa Clara, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 22, 1985, Ser. No. 757,222

Int. Cl.[4] H01S *3/13, 3/19;* H01L *31/12*

U.S. Cl. 372—29 **3 Claims**

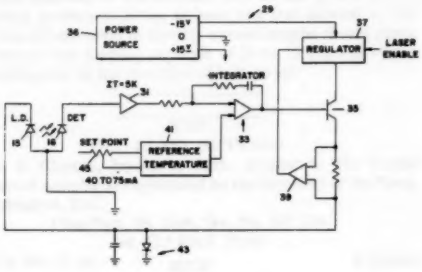
1. A power supply controller for a laser diode including:

(a) a detector for receiving light emitted from the back facet of the laser diode;

(b) an amplifier, an integrator, a reference voltage generator, a power source and a series pass transistor;

(c) the output of said detector being applied to the input of said amplifier, the output of said amplifier being applied to a first input of said integrator, the output of said reference voltage generator being applied to a second input of said integrator, the output of said integrator being applied to the base of said series pass transistor, the output of said power source being passed through said series pass transistor to the power input of said laser diode; whereby

(d) the voltage output of said reference voltage generator is selected to establish a preselected output power from said laser diode and said integrator provides an output signal to said series pass transistor to adjust the power applied to



the power input of said laser diode to maintain constant laser output power.

REISSUES

AUGUST 4, 1987

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,467

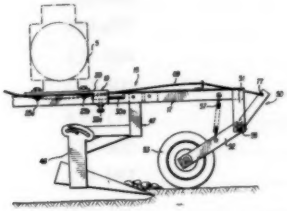
PLOW ATTACHMENT FOR CONVERTING A ROTARY TILLER INTO A PLOW

James A. Mays, Drawer H, Booz, Ala. 35957

Original No. 4,286,671, dated Sep. 1, 1981, Ser. No. 37,884, May 10, 1979. Application for reissue Aug. 31, 1983, Ser. No. 528,267

Int. Cl.[4] A01B *3/58;* **B62D** *51/04*

U.S. Cl. 172—253 **12 Claims**



12. A rotary tiller plow attachment for converting into a plow a rotary tiller of the type having a frame, a pair of handle bars extending rearwardly therefrom, and a power driven transverse axle for turning a set of tines, comprising:

(a) a pair of pull wheels detachably mountable onto said power driven axle;

(b) a plow attachment assembly including a plow;

(c) means for detachably mounting said plow attachment assembly onto the front portion of said tiller frame including at least one elongated element attached to said plow attachment assembly and extending rearwardly thereof, and an L-shaped plate mountable to the frame having at least one bore for receiving said elongated element therein, and means for securing the elongated element in the bore for attaching the plow attachment assembly to the front portion of the tiller frame; and

(d) a height adjusting means mounted on the forward portion of the plow attachment assembly for adjusting the height of said plow attachment assembly between raised and lowered positions.

Re. 32,468

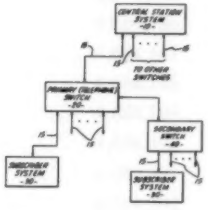
CENTRAL STATION ALARM

Tom W. Le Nay, Encino; Donald L. Hadden, Fountain Valley, and George S. Beckwith, Sherman Oaks, all of Calif., assignors to Baker Protective Services, Inc., Parsippany, N.J.

Original No. 4,228,424, dated Oct. 14, 1980, Ser. No. 951,958, Oct. 16, 1978. Application for reissue Feb. 12, 1985, Ser. No. 700,778

Int. Cl.[4] G08B *26/00*

U.S. Cl. 340—506 **21 Claims**



1. An alarm apparatus operating within a predetermined set of operating parameters comprising

first input means adapted to receive at least one signal representative of the status of an alarm sensor,

second input means for entering changes to said operating parameters other than actuating or deactuating said alarm apparatus,

sequencing means responsive to said first and second input means for generating signals representative of the status of at least one alarm sensor and the changes received from said second input means, and

transmitting means for communicating to a central alarm station the status of the at least one alarm sensor together with the changes to system operating parameters.

PATENTS

GRANTED AUG. 4, 1987

ERRATA

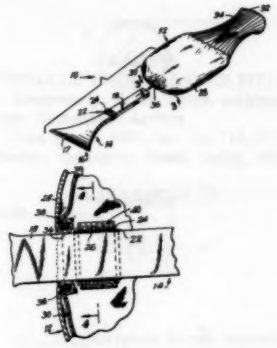
For CLASS	See PATENT NO.
126-123	4,683,623
437-041	4,683,640
437-041	4,683,641
437-040	4,683,642
437-203	4,683,643
437-007	4,683,644
437-041	4,683,645
439-027	4,684,179
439-029	4,684,180
439-059	4,684,181
439-068	4,684,182
439-077	4,684,183
439-064	4,684,184
439-502	4,684,185
439-171	4,684,186
439-600	4,684,187
439-587	4,684,188
439-587	4,684,189
439-587	4,684,190
439-246	4,684,191
439-374	4,684,192
439-259	4,684,193
439-260	4,684,194
439-404	4,684,195
439-411	4,684,196
439-404	4,684,197
439-571	4,684,198
439-610	4,684,199
439-387	4,684,200
439-585	4,684,201
439-752	4,684,202
439-751	4,684,203
439-863	4,684,204
437-228	4,684,415
548-452	4,684,662
530-351	4,684,723
333-204	4,684,875
343-700	4,684,952
343-725	4,684,953
343-909	4,684,954

PATENTS

GRANTED AUGUST 4, 1987

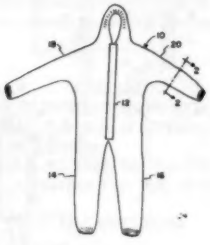
GENERAL AND MECHANICAL

4,683,592
COMBINATION ICE SCRAPER AND MITT
Murray Strongwater, 326 Hewlett Neck Rd., Woodmere, N.Y. 11598
Filed Jun. 12, 1986, Ser. No. 873,421
Int. Cl.[4] A41D *13/08*
U.S. Cl. 2—17 **7 Claims**



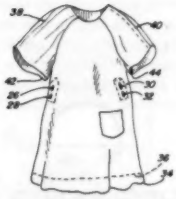
1. A combination ice scraper and mitt comprising:
a one-piece elongated member defining a handgrip at one end and a scraper at the opposite end;
one of a hook engaging material and a hook engageable material secured to the outer surface of said elongated member intermediate said ends;
a mitt having an inner surface, an outer surface, a first opening to permit insertion of a hand within the mitt and a second opening for insertion of said elongated member within said mitt, said mitt being provided on said inner surface thereof, inwardly of said second opening, with the other of said hook engaging material and hook engageable material,
said material on the outer surface of said elongated member being in positive engagement with said material on the inner surface of said mitt inwardly of said second opening for securing said mitt to said elongated member.

4,683,593
PROTECTIVE GARMENT
John D. Langley, Guntersville, Ala., assignor to Kappler, Inc., Guntersville, Ala.
Filed Oct. 17, 1985, Ser. No. 788,321
Int. Cl.[4] A41B *11/00*
U.S. Cl. 2—82 **11 Claims**



1. A protective garment comprising:
a material formed of bonded layers including as a first and inner layer a spun bonded olefin and as a second and outer layer a bondable film from the group of films wherein one film includes polyethylene and the other film includes polyvinylidine chloride;
an inner surface, surface A, of said material being a surface of said spun bonded olefin and the outer surface, surface B, of said material being a surface of said bondable film;
first and second tubular sleeves, each formed of an elongated portion of said material and wherein each sleeve is configured by overlapping side edge regions of said elongated portion, a surface A of one side edge region forming a first thickness of material, lying flat against a surface B of the other side edge region forming a second thickness of material; and
a bonded, sealed, joint between said overlapped side edge regions of said material, bonding being effected continuously by applying ultrasonic energy through said overlapping side edge regions of said first and second thicknesses of material and simultaneously applying pressure to said overlapped side edge region, said pressure being applied at predetermined spaced intervals on serially spaced areas along the said side edge region of said material wherein the combination of adjacent conditions of applied heat and pressure, and heat only, is effected in said side regions and a continuous seal is effected.

4,683,594
GARMENT FOR CONVALESCENTS
Alixandra Feinberg, 1430 William St., River Forest, Ill. 60305
Filed Aug. 15, 1984, Ser. No. 641,168
Int. Cl.[4] A41D *1/22*
U.S. Cl. 2—105 **15 Claims**

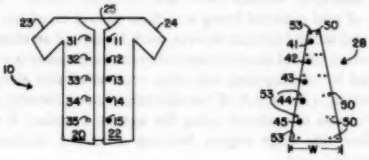


1. A dress-like garment suitable for dignified wear in public for use by a convalescent wearer confined to a wheelchair and secured therein for safety reasons by a restraining device distinct from the dress-like garment, said restraining device having strap portions which are intended to be fastened to such wheelchair, said dress-like garment comprising a body portion, a sleeve portion including an underarm seam, and opening means within the body of said garment through which such strap portions of such restraining device can extend from within to outside of said garment for fastening such restraining device to such wheel chair, said opening means located approximately 6½ inches from the underarm seam of said garment, said garment substantially concealing the restraining device while covering the wearer so as to be suitable for dignified wear in public.

4,683,595
CONVERTIBLE MATERNITY NON-MATERNITY APPAREL

Damon L. Cash, 5467-C Randolph Cir., Washington, D.C. 20336

Filed Sep. 8, 1986, Ser. No. 904,297
Int. Cl.[4] A41D *1/22*
U.S. Cl. 2—105 6 Claims



1. A convertible article of wearing apparel to be worn by a woman before, during and after pregnancy, comprising:

a body portion having a back, sleeves, a neckline, a hemline and a front,

a panel portion of essentially planar triangular configuration for attachment to said front of said body, wherein

said front has first and second lapels defining an opening extending from said neckline to said hemline, and

closure means for securing said opening in a closed configuration, wherein said body alone comprises a first article of wearing apparel and wherein

said panel has anchoring means for cooperating with said closure means and with said lapels to secure said panel into said front opening between said first and second lapels when said opening is in an open configuration, wherein

said panel and said body comprise a second article of wearing apparel when secured by said anchoring means and said closure means.

4,683,596
CURL KEEPING HAIR CAP

Sheila N. Cole, 16551 Plymouth Rd., Detroit, Mich. 48227

Filed Nov. 21, 1985, Ser. No. 800,400
Int. Cl.[4] A42C *5/04*
U.S. Cl. 2—174 2 Claims

1. A curl keeping hair cap comprising:

a. a substantially circular sheet of a single piece of nonabsorbent air permeable nylon material having a 45 mesh which permits air circulation;

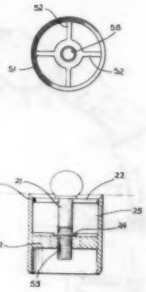
b. a casing of cotton material secured along the circular edge of the sheet of air permeable material; and

c. a drawstring extending through the casing and having an elastic portion positioned in the middle thereof to permit adjustment of the hair cap to fit the contour of the face and neck of the wearer by gathering along the casing, and said drawstring having tie ends which can be tied to each other to maintain the elastic portion in a stretched condition.

4,683,597
DRAIN PLUG

William R. Taylor, Jr., 217 Via Dijon, Newport Beach, Calif. 92663; Robert L. Taylor, 5251 Monroe St. #7, Stanton, Calif. 90680, and Richard H. Taylor, 12672 Barrett La., Santa Ana, Calif. 92705

Continuation of Ser. No. 723,736, Apr. 16, 1985. This application Oct. 20, 1986, Ser. No. 920,757
Int. Cl.[4] A47K *1/14*
U.S. Cl. 4—295 18 Claims



1. A drain/stopper device comprising:

a drain including a shoe assembly having a tapped hole therethrough;

a first washer comprised of resilient material, said first washer having a longitudinal opening therethrough, said first washer having substantially the same diameter as said drain;

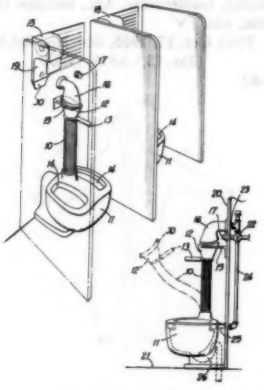
a screw having a head at one end thereof for turning said screw, said screw extending through said opening in said first washer and threadedly engaging said tapped hole of said shoe assembly;

whereby said device will remain in place in said drain even when acted on by water pressure.

4,683,598
URINAL FOR USE BY FEMALES

Kathleen K. Jones, 2938 Owen Bell La., Pensacola, Fla. 32507

Filed Jul. 7, 1986, Ser. No. 882,389
Int. Cl.[4] E03D *13/00*
U.S. Cl. 4—301 6 Claims



1. A urinal for use by females which comprises:

a flexible tube having an upper flared end for covering the vaginal area of a female to receive urine and rinsing means for rinsing said tube after use;

a collecting bowl, to which said flexible tube is unitarily and communicatively attached, for collecting the urine, and said bowl having at least one opening in its upper surface, which such openings are suitable only for disposal of refuse; and

waste disposal means operable to rinse and flush said collecting bowl and to direct the urine and refuse into the sewer system.

4,683,599

AUTOMATIC POOL CLEANER FITTING

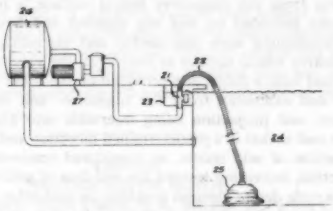
Dieter Rief, Krugersdorp, South Africa, assignor to FAHET NV, Curacao, Netherlands Antilles

Filed Apr. 1, 1985, Ser. No. 718,231

Claims priority, application South Africa, Mar. 30, 1984, 84/2409

Int. Cl.[4] E04H *3/20*

U.S. Cl. 4—490 **3 Claims**



1. A swimming pool cleaning installation including a pump, a filter, an automatic underwater cleaner, and a suction line between the cleaner and the pump, wherein the improvement comprises:

an underwater fitting located in the suction line and having a flow through head portion along a main water flow path of the suction line;

the underwater fitting including,

a leg portion projecting from said head portion,

an adjustable member engaged with the leg portion for defining a constantly open orifice therein, and

a spring biased member positioned within the leg portion, the spring biased member being responsive to variable water pressure through the suction line for automatically adjusting the constantly open orifice to compensate for the variable water pressure,

the adjustable member being threadably engaged with the leg portion and being manually adjustable to provide an initial orifice opening compatible with the suction capability of the cleaner to prevent damage thereto.

4,683,600

FOLDING CHILD'S BED

Udo Beger, Landshut, Fed. Rep. of Germany, assignor to Kurt Gotz, Fed. Rep. of Germany

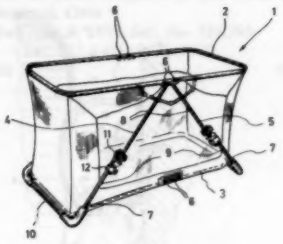
Filed Sep. 23, 1985, Ser. No. 778,789

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1984, 3435529

Int. Cl.[4] A47C *29/00*

U.S. Cl. 5—99 C **9 Claims**

6. A folding child's bed comprising a pair of extendable diagonal support struts, each support strut having upper and lower struts disposed in spaced parallel relationship with each other by means of fixed upper and lower sliding guides respectively securely attached to said upper and lower struts; and means positioned in association with said diagonal struts for



securing said upper and lower struts against respective shortening displacement while in their extended state.

4,683,601

MEDICAL PILLOW

Herbert Lagin, 31 Deer Park Rd., Great Neck, N.Y. 11021

Filed Sep. 22, 1986, Ser. No. 910,409

Int. Cl.[4] A47G *9/00*

U.S. Cl. 5—431 **7 Claims**

1. A medical pillow for facilitating recovery from a surgical operation comprising:

(a) a chest contacting section of sufficient size to accommodate a substantial portion of the patient's chest area;

(b) a holding means connected to said chest contacting section to facilitate holding by the patient said chest contacting section against the chest area of the patient; and

(c) a pair of underarm and patient side engaging wing sections, laterally extending from and connected to said chest contacting section which together with said chest contacting section, when said medical pillow is held by the patient, substantially conform to the patient's sides and chest area.

4,683,602

WATERBED AND HOLDER ASSEMBLY FOR USE THEREWITH

Steve F. Bissel, 8 Robb Rd., Beverly, Mass. 01915

Filed May 28, 1986, Ser. No. 867,534

Int. Cl.[4] A47C *27/08*; A47G *9/00*

U.S. Cl. 5—451 **16 Claims**

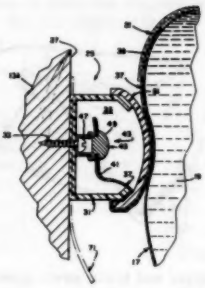
1. A holder assemby for releasably securing an article of bedclothing to a waterbed frame, said holder assembly comprising:

a base member for being secured to said frame, said base member being of elongated configuration and defining a channel therein;

an expandable, resilient member having a first portion for being secured to said article of bedclothing and a second portion for being releasably secured to said base member;

first retention means for releasably securing said second portion of said expandable, resilient member to said base member; and

second retention means for being secured to said base member and for engaging said expandable, resilient member to



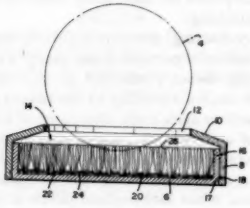
retain said expandable, resilient member against said base member.

4,683,603

GOLF BALL CLEANER

John M. Purlia, and Stephen J. Jankowski, both of P.O. Box 4692, Scottsdale, Ariz. 85261

Filed May 23, 1985, Ser. No. 737,213
Int. Cl.[4] A63B 47/04
U.S. Cl. 15—104.94 **8 Claims**



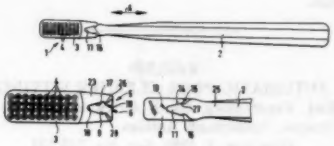
1. Apparatus for cleaning a golf ball consisting of cleaning means for engaging a portion of the exterior surface of a golf ball and cleaning said portion, and holder means for holding said cleaning means and a cleaning liquid in sufficient quantity to allow said cleaning means to clean said portion, said holder means consisting of a generally flat bottom engaging said cleaning means, a wall extending upwardly from the outer perimeter of said bottom to an upper terminus, and a lip extending inwardly from said upper terminus to form an opening for allowing a golf ball to be inserted to engage said cleaning means, said cleaning means consisting of a pad having filaments extending upwardly therefrom to a height equal to or less than the top of said wall and substantially covering said bottom, wherein said wall and said bottom are secured together to provide a liquid-tight seal, and wherein said lip extends inwardly to form with said bottom and said wall a chamber of adequate size and containing a portion of said pad and filaments to prevent said cleaning liquid from flowing out of said opening when said opening lies in a vertical plane and said holder means contains said quantity of said cleaning liquid.

4,683,604

TOOTHBRUSH WITH EXCHANGEABLE BRISTLE CARRIER

Fritz A. Rueb, Oberfeldstrasse 1-5, D-7869 Schönau, Fed. Rep. of Germany

Filed Nov. 12, 1985, Ser. No. 797,240
Claims priority, application Fed. Rep. of Germany, Mar. 26, 1985, 3510909
Int. Cl.[4] A46B 9/04
U.S. Cl. 15—176 **19 Claims**



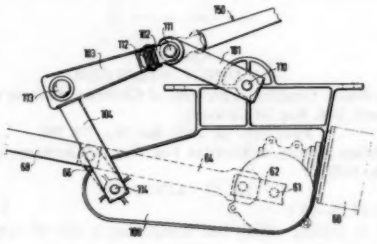
1. A composite toothbrush comprising a handgrip member; a bristle carrying member, said members having confronting end faces and lateral surfaces adjacent to the respective end faces, the end face of one of said members having a socket remote from the respective lateral surface; a female detent element provided on said one member and having a recess communicating with said socket and extending toward the respective lateral surface as well as all the way to the respective end face; a projection provided on the other of said members and extending from the respective end face into said socket, said projection being insertable into and extractible from said socket in a predetermined direction and the width of a portion of said recess, as considered transversely of said direction, increasing toward the end face of said one member; and a male detent element provided on said other member and being formlockingly received in said recess to maintain said projection in said socket, said male detent element at least substantially filling said recess and having at least one undercut, said female detent element having a protuberance in said undercut, said male detent element having a portion of maximum width, as considered in said direction, and said undercut being adjacent to said portion of maximum width, said male detent element further having a first flank which makes an acute angle with said direction and a second flank located in said undercut and making an oblique angle with said first flank.

4,683,605

WIPING ARRANGEMENT FOR WINDOWS OF VEHICLES

Andre Leroy, Mons, and Jean M. Flamme, Beloeil, both of Belgium, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 8, 1985, Ser. No. 796,578
Claims priority, application Belgium, Nov. 14, 1984, 901052
Int. Cl.[4] B60S 1/02
U.S. Cl. 15—250.21 **8 Claims**



1. A wiping arrangement for windows of vehicles, compris-

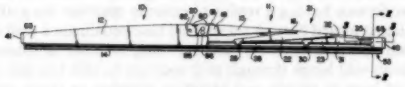
ing a wiper arm which carries a wiping blade; drive means providing a rotary movement; and swinging transmission means arranged to change the rotary movement of said drive means into a complex alternating movement to said wiper arm, said swinging transmission means including a pushing crank transmission and a subsequently arranged spatial five-link linkage having one degree of freedom, said five-link linkage having five rigid transmission members and hinges connecting said transmission members with one another, said wiper arm being fixedly connected with a rod of said five-link linkage, said transmission members including a frame arranged stationarily with respect to the body of the vehicle, or including the body itself of the vehicle, a swinging member which is connected with said frame via a hinge formed as a pivotal connection, a first rod which is connected with said swinging member via one of said hinges, a second rod which is connected with the first rod via another of said hinges, and a swinging lever driven by said pushing crank transmission, said swinging lever connected with said rod via a further of said hinges and also connected via still a further of said hinges formed as a pivotal connection with with said frame, said hinges provided on said frame being arranged at a distance from one another, said hinge between one of said rods and one of its adjoining members being a spherical one and said hinge between this rod and its other adjoining member being formed as a pivotal connection the axis of which is obliquely located with respect to the axis of one at least of the other pivotal connections comprised in said spatial, five-link linkage, said first rod supporting said wiper arm, said second rod being a coupling one, and said hinge between said coupling rod and said swinging lever being the spherical one.

4,683,606

WINTER WIPER BLADE

Bernard C. Sharp, White Plains, N.Y., assignor to Parker Hannifin Corporation, Cleveland, Ohio

Filed Oct. 10, 1985, Ser. No. 786,397
Int. Cl.[4] B60S 1/38
U.S. Cl. 15—250.42 **6 Claims**



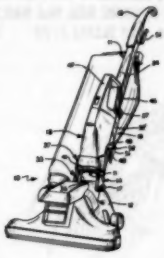
1. A winter wiper blade assembly, comprising
a flexible, pressure applying and distributing frame,
a rubber boot enclosing said frame, and
a wiper blade secured in said frame for engagement with the windshield of a vehicle, said wiper blade having an anchoring bead and a wiping edge,
said frame comprising primary and secondary yokes, said secondary yokes being pivotally supported at either end of said primary yoke and having one or more claws,
a longitudinally extended flexible backing strip retained in said claws, said backing strip having a longitudinal groove therein receiving a portion of said rubber boot and the anchoring bead of said wiper blade,
said rubber boot having longitudinally extending, peripherally closed channels at either end, and
end caps at either end of said frame closely received in said channels of said boot and interlocked with said secondary yokes, each said end cap comprising an extended longitudinal surface for sealingly engaging said respective rubber boot channel, an end claw for slidably receiving and supporting said backing member, and
a pair of longitudinally extending spring arms having barbs thereon, each said secondary yoke having a pair of longitudinal slots at the outer end thereof adapted for receipt of said spring arms.

4,683,607

VACUUM CLEANER ACCESSORY BRACKET

John R. Lackner, North Ridgeville, and William E. Bartasevich, Jr., Kent, both of Ohio, assignors to The Scott & Fetzer Company, Cleveland, Ohio

Filed May 9, 1985, Ser. No. 732,395
Int. Cl.[4] A47L 9/00, 9/32
U.S. Cl. 15—323 **14 Claims**



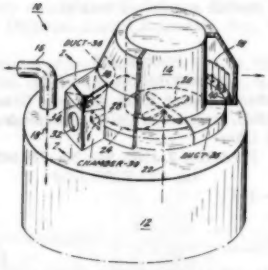
1. In combination, a vacuum cleaner having an elongate handle, an elongate accessory cleaner and a bracket, said bracket being adapted for removable mounting on the handle, said bracket including means for securely holding the accessory cleaner proximate the handle, said holding means providing for convenient removal of the accessory cleaner from such held condition and replacement of the accessory cleaner in such held condition, said bracket providing a rigid body portion contoured to the handle and mountable as a sleeve on the handle.

4,683,608

ALTERNATE BLOWER OUTLET FOR VACUUM CLEANER

Robert C. Berfield, Jersey Shore, and Ronald F. Meland, Muncy, both of Pa., assignors to Shop-Vac Corporation, Williamsport, Pa.

Filed Jan. 27, 1986, Ser. No. 823,049
Int. Cl.[4] A47L 5/36
U.S. Cl. 15—328 **17 Claims**



1. In a vacuum cleaner having an inlet leading into a collection chamber, a fan for withdrawing air from the collection chamber and directing it at high speed into a first duct, and a motor for driving the fan, the improvement, in combination with the foregoing, comprising:
a second duct positioned above the first duct and in switchable flow communication therewith, the second duct including an effective large area opening through which air injected from the first duct may diffuse quietly into the external atmosphere; and
valve means for interconnecting the first duct alternately to a hose receptacle opening when an outlet hose is to be

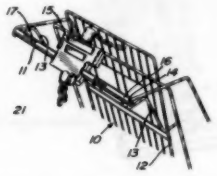
used or to the second duct to ensure quiet operation of the vacuum cleaner by diffusing exhaust air through the effective large area opening in the second duct.

4,683,609

SHOPPING CART HANDLE HAVING AN INTEGRAL LOCK PIN

Antoine Trubiano, Pointe Aux Trembles, Canada, assignor to Cari-All Inc., Quebec, Canada

Filed Apr. 8, 1986, Ser. No. 849,385
Int. Cl.[4] B25G *3/26*
U.S. Cl. 16—114 R **4 Claims**



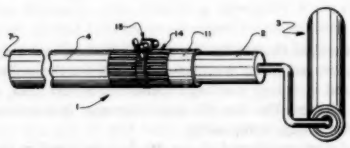
1. A handle for a shopping cart, said handle comprising an elongated tubular member of square cross-section and having opposed securable ends, a pair of spaced apart handle support arms secured to said shopping cart for securement of said handle thereto, attachment means in each said ends of said tubular member and including a fastener element and arresting means preventing axial rotation of said tubular member, said arresting means comprising the combination of a lock pin extension formed at each said ends of said tubular member and extending outwardly thereof, and a retention cavity formed in a handle attachment portion of each said handle support arms, said lock pin extension being received in an arresting passageway of an attachment portion of an associated handle support arm, said retention cavity being of square cross-section for receiving in close fit therein a respective one of said opposed securable ends, said fastener element being secured to said attachment portion of said support arm and extending axially in said tubular member for retention of said lock pin extension in said passageway thereby preventing axial rotation of said tubular member, said fastener element also retaining said opposed securable ends in tension in their respective retention cavity, said elongated tubular member is a hollow metal tube, said lock pin extension being a right angled corner unitary extension of said tube to provide a structural lock pin.

4,683,610

HANDLE EXTENSION

John O. Richards, Hemet, Calif., and John Graef, Middleburg Heights, Ohio, assignors to Universal Extension Corporation, Cleveland, Ohio

Filed May 2, 1985, Ser. No. 729,669
Int. Cl.[4] B25G *1/04*
U.S. Cl. 16—115 **8 Claims**



1. A handle extension including:

(a) an elongated tube having longitudinal ends and being formed by a cylindrical wall having a hollow bore therethrough and one of said ends terminating in at least one open end;

(b) a plurality of longitudinally extending slots formed in the tube and extending completely through the cylindrical wall and into the hollow bore, the ends of said slots being longitudinally spaced inwardly from the ends of said tube and forming a plurality of circumferentially spaced flexible strips of material integral with the tube;

(c) said tube having a circumferentially continuous annular band portion of tube material located between said slots and said open end;

said annular band portion, said strips and the remainder of said tube being integral; and

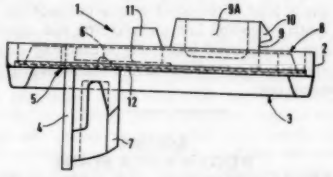
(d) clamp means encircling the tube generally at a longitudinal center of the strips for compressing the strips radially inwardly for gripping a handle telescopically inserted into the tube bore through the open end.

4,683,611

LOCKING FOOT FOR SECUREMENT TO SUPPORT

Gilbert Ambal, Frepillon, France, assignor to ITW de France, D.A., Beauchamp, France

Filed Sep. 16, 1985, Ser. No. 776,308
Claims priority, application France, Sep. 21, 1984, 84 14528
Int. Cl.[4] A44B *17/00*
U.S. Cl. 16—225 **2 Claims**



1. A one piece plastic push-in fastener for securement within an aperture of a workpiece comprising:

a base member having top and bottom sides and a particular shaped aperture proximate one longitudinal end thereof; and

a resilient retaining means for affixing said fastener to said workpiece having a resilient retaining member integrally hinged to said bottom side of said base proximate a wall of said aperture whereby said retaining member is rotated about said hinge through said aperture to said top side of said base to enable said retaining member to retain said fastener within said aperture of said workpiece, and said top side of said base including an upstanding integral locking pin for engagement with said retaining member to prevent said retaining member from being rotated back through said particular shaped aperture to said bottom side of said base and to provide necessary retention forces.

4,683,612

FURNITURE HINGE WITH A LATERAL AND DEPTH ADJUSTMENT FITTING

Alfred Grass, Konsumstrasse 20, Höchst/Vlbg., Austria (6973)

Filed Oct. 8, 1985, Ser. No. 785,434
Claims priority, application Austria, Oct. 8, 1984, 3175/84
Int. Cl.[4] E05D *7/06*
U.S. Cl. 16—240 **11 Claims**

1. A furniture hinge with a lateral and depth adjustment fitting for a door wing, comprising:

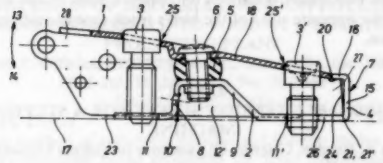
(a) a base plate (**2**) with elongated holes (**11, 11'**) for attachment to a support surface (**17**) of a piece of furniture;

(b) an inverted, U-shaped hinge arm (**1**) having a free end (**27**) opposite a door wing end (**28**) and disposed on the base plate and having pivot bearing means (**7**) securing on said free end of the hinge arm;

(c) adjusting means to adjust the hinge arm inclination relative to the base plate comprising an adjustment screw (**6**) and a spring element (**5**), wherein the adjustment screw is

inserted through the spring element and adjustably connects the hinge arm and base plate;

(d) said pivot bearing means comprising a lug (4) formed on one end of the base plate and securing the free end of the hinge arm, wherein said lug is U-shaped and includes a first leg (15) contiguous with the base plate and approxi-



mately perpendicular thereto and a second (16) leg contiguous with said first leg and directed towards the door wing end in a parallel relation with the base plate; and

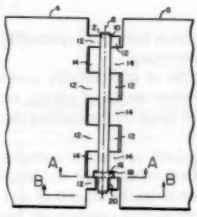
(e) fixing screws (3, 3') inserted through holes (25, 25') in the hinge arm and into the elongated holes in the base plate to secure the base plate to the support surface.

4,683,613

SEPARABLE HINGE WITH SELF RETAINING HINGE PIN

Roy R. Starke, Palm Beach Gardens, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 27, 1986, Ser. No. 866,807
Int. Cl.[4] E05D *7/10*
U.S. Cl. 16—262 **1 Claim**



1. A separable hinge comprising:

first and second hinge members and a cylindrical hinge pin;

said first and said second hinge members each having a plurality of hinge fingers;

said fingers of said first and of said second hinge members being interleaved;

a hinge pin bore formed through said fingers of said first and of said second hinge members;

said hinge pin having a head spaced from each end of said pin;

said head having a rectangular cross section normal to the longitudinal axis of said pin and symmetrically positioned with respect to said longitudinal axis of said pin;

said head having a first pair of opposed sides separated by substantially the same distance as the diameter of said cylindrical pin, and having a second pair of opposed sides separated by a substantially greater distance than said diameter of said cylindrical pin;

an end of one of said fingers of said first hinge member having a cavity therein adapted to accept said head on said hinge pin;

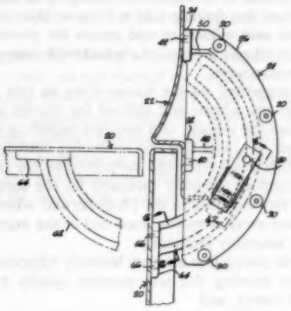
an end one of said fingers of said second hinge member being adjacent and external to said end one of said fingers of said first hinge member and having a slot in said hinge pin bore therethrough permitting said head on said hinge pin to be inserted therethrough into said cavity only when said first and second hinge members are positioned perpendicular to each other.

4,683,614

SLIDE HINGE

John P. Anderson, Norco, Calif., assignor to Hartwell Corporation, Placentia, Calif.

Filed Jan. 22, 1986, Ser. No. 821,389
Int. Cl.[4] E05D *7/10*
U.S. Cl. 16—362 **6 Claims**



1. A hinge for pivotally attaching two bodies, comprising

a housing defining a channel therein, said channel defining a planar curve;

a curved beam slidably disposed in said channel, said curved beam having a flange at one end thereof and said housing including a boss positioned in said channel to engage said flange, said housing including a spring clip which engages said flange and urges same against said boss to retain said curved beam in a selected position;

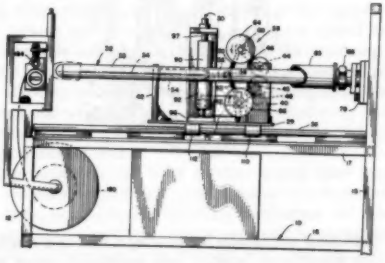
mounting surfaces on said housing and said curved beam for mounting said housing and said curved beam to the bodies.

4,683,615

SHIRRING DEVICE

Roman M. Tomczak; Alfred J. Evans, both of Raleigh; Graat K. R. Chen, Cary, and Edward P. Brinson, Raleigh, all of N.C., assignors to Delaware Capital Formation, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 787,506, Oct. 15, 1985, Pat. No. 4,624,029. This application Sep. 29, 1986, Ser. No. 911,967
Int. Cl.[4] A22C *13/02*
U.S. Cl. 17—1 R **10 Claims**



1. Apparatus for shirring of casing comprising, in combination:

a mounting frame;

a shirring wheel, support station slidably mounted on the frame, said station including:

a support platform,

first and second generally parallel, spaced, opposed, support arms, each arm pivotally supported at one end on the platform, the opposite end of one arm pivotal toward and away from the opposite end of the other arm,

means for pivoting at least one of the arms toward and away from the other arm,

each of said arms including a shirring wheel rotatably mounted thereon, said wheels being opposed to one another and rotatable about axes generally transverse to the direction of movement of casing to be shirred,

drive means for driving said wheels to shirr casing fed between said wheels as said means for pivoting maintains the wheels in physical contact with casing material fed therebetween;

a mandrel supported on the frame along an axis generally tangent to the wheels and aligned for receipt of shirred casing from the wheels, said mandrel including a free end and a fixed end, said free end extending between the opposed wheels, said fixed end supported by the frame; and

a casing transport assembly mounted on the support platform for movement with the platform and wheels axially toward and away from the fixed end of the mandrel, said transport assembly including:

at least one casing jaw member laterally adjacent the axis,

means for moving the jaw member axially to engage shirred casing, and

means for releasing the jaw member from engagement with shirred casing by movement in a reverse axial direction.

4,683,616

STRETCHING MECHANISM OF A DEVICE FOR CUTTING SLAUGHTERED POULTRY

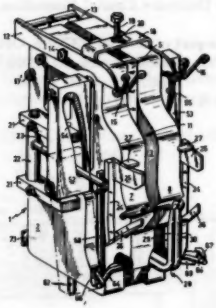
Edward J. Tieleman, Doesburg, Netherlands, assignor to Linco Holland Engineering B.V., Doesburg, Netherlands

Continuation of Ser. No. 456,180, Jan. 6, 1983, Pat. No. 4,505,002. This application Mar. 18, 1985, Ser. No. 712,778

The portion of the term of this patent subsequent to Mar. 19, 2002, has been disclaimed.

Int. Cl.[4] A22C *21/00*

U.S. Cl. 17—11 **9 Claims**



1. A stretching mechanism for holding a bird in a machine which cuts slaughtered poultry, said mechanism being provided with a support surface for the bird, means for hanging the bird by its legs, means for holding the wings of the bird, and trunk holding means for holding the trunk against the support surface, said trunk holding means including two members which are operable to hold the bird against the support surface at two spaced apart locations while the bird is being cut, means for producing relative movement between the trunk holding means and the support surface to move the trunk holding means in a path which is inside the trunk of the bird and extends toward the support surface, said trunk holding means being movable to and from an operative end position at which said two members engage the inside of the trunk of the bird at two spaced locations on opposite sides of the bird to hold the opposite sides of the bird's trunk against said support surface.

4,683,617

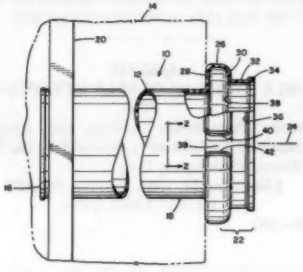
DISPOSABLE TENSION SLEEVE FOR A STUFFING MACHINE

Vytas A. Raudys, Chicago, Ill., assignor to Viskase Corporation, Chicago, Ill.

Filed Aug. 26, 1986, Ser. No. 900,573

Int. Cl.[4] A22C *11/00*

U.S. Cl. 17—41 **12 Claims**



1. A disposable tension sleeve for releasable attachment to a stuffing machine comprising:

(a) an elongated tube of substantially constant diameter for supporting a shirred length of casing, said tube having a fore end oriented towards the stuffing direction and an aft end;

(b) a circular snap-lock connector component coaxial with the longitudinal axis of said tube and longitudinally spaced in an aft direction from the aft end of said tube, said circular snap-lock connector component having a diameter larger than the diameter of said tube;

(c) a circular spacer strip coaxial with the longitudinal axis of said tube, said spacer strip being disposed between said aft end and said circular snap-lock connector component, and said spacer strip having a diameter larger than said snap-lock connector component;

(d) longitudinally spaced radial walls connecting opposite side edges of said spacer strip to said aft end and said circular snap-lock connector component respectively, said spacer strip and radial walls comprising separation means to prevent obstruction of said circular snap-lock connector component by shirred casing on said tube;

(e) said circular snap-lock connector component comprising a continuous circular section connected at one edge to one of said radial walls, and a continuous and unbroken circular lip extending longitudinally in an aft direction from an opposite edge of said circular section, said lip defining the end of said sleeve releasably connectable to the stuffing machine, and said lip being larger in diameter than the diameter of said circular section so as to form an external shoulder at the juncture between said lip and said circular section;

(f) said circular snap-lock connector component being resiliently radially deformable for snap connection to a mating connector on the stuffing machine; and

(g) said snap-lock connector component having an outer peripherial surface, a portion of which is adapted to receive a pressing member thereagainst for inwardly deforming at least a portion of said snap-lock connector component radially to release its snap connection from the mating connector on the stuffing machine.

4,683,618

REDUCTION OF BACTERIA COUNT ON POULTRY BEING PROCESSED INTO FOOD AT A POULTRY PROCESSING PLANT

Gerard T. O'Brien, 2162 Skyline Dr., Gainesville, Ga. 30501

Filed Jul. 28, 1986, Ser. No. 893,366
Int. Cl.[4] A22C *21/00*
U.S. Cl. 17—51 **1 Claim**

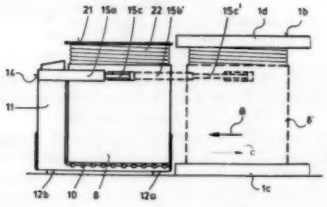
1. A method of removing bacteria and foreign matter from poultry carcasses being processed for food comprising the steps of deluging the carcasses with water, then spraying said carcasses with an atomized high velocity solution of baking soda and water, deluging said carcasses with water again, then spraying said carcasses with an atomized high velocity solution of baking soda and water for the second time, then spraying said carcasses with an atomized mist of 3% hydrogen peroxide, and finally deluged said carcasses again with ordinary plant tap water.

4,683,619

APPARATUS FOR CAN CHANGING

Manfred Langen; Konrad Temburg, and Paul Teichmann, all of Mönchengladbach, Fed. Rep. of Germany, assignors to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany

Filed Sep. 9, 1986, Ser. No. 905,263
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1985, 3532173; Jun. 26, 1986, 3621370
Int. Cl.[4] D01H *9/18*; B65H *67/06*
U.S. Cl. 19—159 A **22 Claims**



1. An apparatus for transporting at least one can between a sliver furnishing fiber processing machine and a sliver fed fiber processing machine, comprising: a transporting carriage and a device mounted on said carriage for loading and unloading the at least one can; said loading and unloading device including a conveying element for moving the at least one can with respect to said transporting carriage.

4,683,620

SAFETY CLOSURE DEVICE PARTICULARLY FOR SKI BOOTS

Carlo Valsecchi, Via Cipollina, 3; Franco Piatti, Via Nazionale, 43, and Giuseppe B. Bazzi, Via Campione, all of Colico, Italy

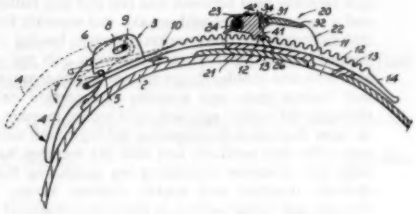
Filed Oct. 16, 1984, Ser. No. 661,484
Claims priority, application Italy, May 8, 1984, 9513/84[U]
Int. Cl.[4] A43C *11/14*
U.S. Cl. 24—71 SK **3 Claims**

1. A safety closure device for joining together opposite flap portions particularly for ski boots and which comprises fixed on a first flap portion a lever actuated tensioning mechanism including a lever actuated link element and fixed on a second flap portion opposite to said first flap portion an openable clamping mechanism for releasably clamping said link element in a selected position relative to said second flap portion, wherein said lever actuated mechanism comprises,

a base member fixed on said first flap portion and having at least one upwardly extending wing formation including a first elongated slot coupling means arranged transversely at a first distance from said first flap portion,

said wing formation having a shaped portion facing in a direction away from said openable clamping mechanism, said shaped portion having a recess defining a locking seat opening in said direction away from said openable clamping mechanism and arranged transversely at a second distance from said first flap portion, said second distance being smaller than said first distance,

a lever member having a second elongated slot coupling means near one end thereof for cooperation with said first elongated slot coupling means for slidable translatory and rotatory engagement therewith, said first elongated slot coupling means including an elongated slot having a longitudinal extension in a direction towards said openable clamping mechanism thereby to allow said lever member to be displaced with freedom of rotation from a first end



position farthest from said openable clamping mechanism to a second end position nearest to said openable clamping mechanism,

a peg formation of said lever and spaced apart from said second elongated slot coupling means in a direction away from said openable clamping mechanism, the position and distance of said peg formation relative to said second elongated slot coupling means allowing said peg formation to be engaged within said locking seat when said lever member is shifted towards said openable clamping mechanism under the tensioning action of said link element to thereby reach said second end position and allowing said peg formation to be disengaged from said locking seat when said lever member is shifted away from said openable clamping mechanism thereby reaching said first end position thereof, and

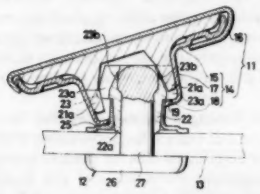
hinge means on said lever member spaced apart from said second elongated slot coupling means in a direction away from said openable clamping mechanism for hingedly connecting said link element onto said lever member,

thereby to lock said lever member with said peg formation within said locking seat when said link element is under tension and to release said lever member and said peg formation thereof from said locking seat when said link element is slackened.

4,683,621
FLEXIBLE BUTTON

Hirokazu Watanabe, Kurobe, Japan, assignor to Nippon Notion Kogyo Co., Ltd., Tokyo, Japan

Filed Oct. 1, 1985, Ser. No. 782,589
Claims priority, application Japan, Oct. 2, 1984, 59-149216[U]
Int. Cl.[4] A44B 1/42
U.S. Cl. 24—95 6 Claims

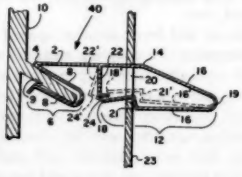


1. A button for attachment to a garment fabric, comprising:
(a) a button body including a button back and a cap covering said button back on one side to face away from the fabric, said button back including a hollow hub disposed remotely from said cap and extending perpendicularly to and centrally of said cap, said hollow hub having at its one end an annular flange defining a central aperture;
(b) a two-piece interior part including a disk-like member non-turnably held between said cap and said button back, and a socket member with an axis and separate from said disk-like member, said socket member having a collar portion loosely received in said hollow hub and engageable with said annular flange so as not to be removed from said hollow hub, and a collar-free portion extending through said central aperture, said socket member having an axial through-hole extending through both said collar and collar-free portions, said disk-like member having at least one off-center unyielding leg projecting from said disk-like member, said socket member having in and through said collar portion at least one peripheral groove receiving said leg therethrough, said groove having a sloping bed surface along which said leg is slidable to be tilted with respect to the axis of said socket member;
(c) an eyelet member non-turnably mounted on said socket member and having a tube covering said collar-free portion of said socket member and loosely received in said central aperture of said hollow hub; and
(d) a tack member including a head and a central shank projecting perpendicularly from said head for reception into said axial through-hole of said socket member and adapted to be non-removably deformed in said axial through-hole.

4,683,622
RELEASABLE FASTENER

Donald N. Oehlke, Troy, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 6, 1986, Ser. No. 836,870
Int. Cl.[4] A44B 21/00
U.S. Cl. 24—458 5 Claims

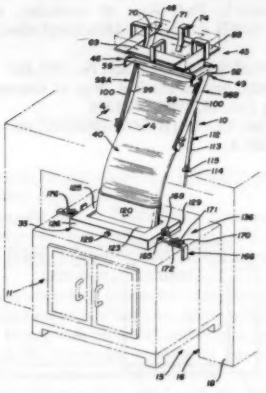


1. A fastener comprising a base member, means disposed at an end of the base member for securing the fastener to an object, a resilient compressible arm extending away from an opposite end of the base member and thence curving reversedly toward the base member to a free-end thereof that is in spaced-apart relationship thereto, said arm dimensionally adapted such that in a compressed state said arm is able to be inserted into an opening in an article and in an expanded state said arm is able to expand against opposed edges of said opening sufficiently to secure the fastener thereto with said free-end exposed sufficiently on the side of the opening into which said arm is inserted to enable the compression thereof, and latching means extending from the base member and accessible to the compressible arm free-end while said arm is in the expanded state within the opening securing the fastener to the article, said latching means operable to releasably engage said compressible arm free-end upon the compression thereof while said arm is within said opening and hold said arm in the compressed state until the release thereof from said latching means.

4,683,623
POSITIVE INTERCONNECT SYSTEM

Joseph M. Cannata, 646 Gloucester Dr., Highland Heights, Ohio 44143

Filed Oct. 14, 1986, Ser. No. 918,475
Int. Cl.[4] F24B 7/00
U.S. Cl. 126—123 32 Claims



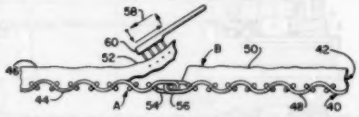
1. A positive interconnect system for a fireplace insert having an exhaust vent, the insert to be received within a fireplace having a damper frame and a flue liner which terminates upwardly of a smoke chamber provided between the damper frame the lowermost extend of the flue liner within a chimney;
a composite connector assembly having first and second end openings;
the first end opening of said composite connector assembly having dimensions that substantially correspond with the dimensions of the flue opening of the lowermost extent of the liner; means presented from said first end opening of said composite connector assembly to effect a sealing engagement with the lowermost extent of the flue liner;
a flexible duct having upper and lower end openings;
the second end opening of said composite connector assembly being adapted to communicate with the upper end opening of said flexible duct;
an insert connector;
the lower end opening of said flexible duct communicating with said insert connector; and,
fastening means by which to secure said insert connector in communication with the exhaust vent of the insert.

4,683,624

METHOD FOR STEAMING A PAPERMAKER'S FABRIC

Marcel Dufour, Saint Yrieix, France, assignor to Cofpa, France

Filed Jan. 24, 1986, Ser. No. 822,292
Claims priority, application France, Feb. 19, 1985, 85 02349
Int. Cl.[4] D06H 5/00
U.S. Cl. 28—141 3 Claims



1. A method for seaming the ends of a papermaker's fabric during installation on papermaking equipment comprising:

(a) providing a base fabric having at least a first batt needled thereto such that one end of the batt extends beyond the corresponding end of the base fabric a sufficient distance to overlap the opposing end of the batt when the ends of the base fabric are joined;

(b) joining the opposing ends of the base fabric to form a continuous belt;

(c) overlapping the extended end of the batt upon its opposite end;

(d) cutting the overlapping batt ends across the width of the fabric such that the opposing batt ends are configured to complement each other;

(e) combing each of the complementary batt ends for a length equal to at least the thickness of the batt such that the fiber dispersion of the batt material is decreased and the ends of the batt are lengthened;

(f) overlapping the combed batt ends; and

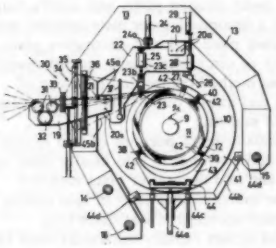
(g) needling the overlapping combed batt ends together and to the base fabric such that the batt material of each end of the batt is interdispersed with each other and the resultant material has essentially the same uniform internal construction, density, thickness and surface texture as the remainder of the fiber batt.

4,683,625

APPARATUS FOR THE PRODUCTION OF SHORT WARPS ESPECIALLY FOR CLOTH DESIGNS IN MULTICOLOR WEAVING

Erich Baltzer, Nordhorn, Fed. Rep. of Germany, assignor to Hergeth Hollingsworth GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 582,042, Feb. 21, 1984, abandoned, Continuation-in-part of Ser. No. 185,963, Sep. 10, 1980, abandoned. This application Jul. 3, 1986, Ser. No. 881,664
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1979, 2938902
Int. Cl.[4] D02H 9/02
U.S. Cl. 28—191 1 Claim



1. Apparatus for the production of a wound yarn package comprising

a drum (10) having an axis of rotation, a generally cylindrical portion (11) and a conical ascending initial portion (12) upon which yarn is adapted to be wound,

means (8) for rotating the drum (10) during a winding operation.

a carriage (13) surounding said drum (10),

guideways (14, 15) supporting said carriage (13) for sliding motion generally parallel to the axis of said drum (10),

means (20, 20a, 21) for detachably securing a carrier section (22) to said carriage (13),

means (30) for guiding the yarns at a plate (19) of the carriage (13),

said guiding means (30) including at least a heald frame (34) with shaft means (35) for shed formation and a leasing reed (36),

at lease two lease rods (38, 39, or 39, 40) and one overrun rod (27) carried by a housing (41) rotating with said drum (10), said overrun rod (27) stabilizing a yarn package incident to the formation of a new yarn package,

a slide rod (23) carried by said carrier section (22) for enabling said lease rods (38, 39, 40) to proceed to proper position for leasing,

means (47, 48, 49, 41 and 16, 29, and 43, 44, 44b) respectively for moving said lease rods (38, 39, 40) and the overrun rod (27) generally transverse to the drum axis, and

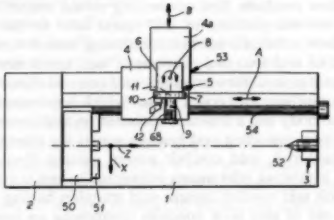
means (16) for imparting sliding motion to said carriage (13) along said guideways (14, 15) thereby moving said lease rods (38, 39, 40) and said overrun rod (27) generally parallel to the drum axis.

4,683,626

TOOL HOLDER FOR A MACHINE TOOL

Karl Steiner, Vienna, Austria, assignor to Maschinenfabrik Heid Aktiengesellschaft, Vienna, Austria

Filed Dec. 10, 1985, Ser. No. 807,093
Claims priority, application Austria, Dec. 10, 1984, 3913/84
Int. Cl.[4] B23B 3/16
U.S. Cl. 29—40 13 Claims



1. A machine tool, comprising:

an elongated machine-tool bed;

a headstock at one end of said bed provided with means for rotating a workpiece about a longitudinal axis extending along said bed, said bed forming a track generally parallel to said axis;

a longitudinal slide shiftable along said track on said bed generally parallel to said longitudinal axis in a first rectilinear direction;

a crossfeed arrangement on said longitudinal slide;

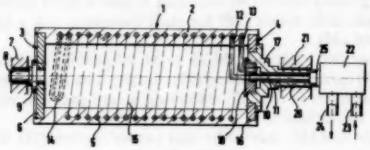
a tool holder mounted on said crossfeed arrangment and provided with a cutter, and means for swinging said cutter angularly about two distinct cutter-swing axes including an angle with one another and one of which is generally perpendicular to a plane of movement of the tool holder; and

cutting-program-control means connected at least to said means for swinging said cutter for angularly displacing said cutter automatically, steplessly and under control of a cutting program about each of said cutter-swing axes during the course of material-removal machining of said workpiece by said cutter.

4,683,627
ROLL FOR PROCESSING A WEB OR STRIP OF MATERIAL

Klaus Reinhold, Lienener Strasse 59, 4540 Lengerich (Westf.), Fed. Rep. of Germany

Filed Mar. 14, 1985, Ser. No. 711,866
Claims priority, application Fed. Rep. of Germany, Mar. 24, 1984, 8409106[U]
Int. Cl.[4] B21J 7/00
U.S. Cl. 29—110 5 Claims



1. A roll for processing material in the form of a web or strip comprising a hollow metal body, said body being of a cylindrical configuration and having a cylindrical wall and two longitudinal ends, a spiral metal tube for carrying a heat exchange medium, said spiral tube being rigidly embedded within said cylindrical wall, an end closure means on each longitudinal end of said cylindrical body closing each of the two longitudinal ends of the cylindrical body, one of said end closure means having conduit means for conducting a heat exchange medium to and from said spiral tube, said one end closure means comprising a cover means having a bearing means for rotatably supporting the roll, said conduit means being carried by said one end closure means, the other of said end enclosure means comprising a bearing plate having a bearing means for rotatably supporting the roll, said other closure means closing the hollow interior of said cylindrical body, said spiral tube having two end portions each juxtaposed to said one end closure means, said spiral tube having a return bend juxtaposed to said other end closure means, said conduit means comprising two coaxial flow conduits, first connecting means connecting one of said two end portions of said spiral tube to one of said coaxial flow conduits, second connecting means connecting the other of said two end portions of said spiral tube to the other of said coaxial flow conduits, said one end closure means further comprising said cover means which is mounted on said cylindrical body and a trunnion mounted on said cover means, said trunnion providing said bearing means for rotatably supporting said roll, said conduit means passing through said trunnion, a rotating inlet means connected to and in communication with said conduit means, said trunnion having an axial passage, one of said flow conduits comprising an inner tube, the other of said flow conduits being defined by an outer axial passageway formed between the outer wall of said inner tube and said axial passage in said trunnion, third connecting means connecting one longitudinal end of said inner tube and a longitudinal end of said outer axial passageway to said rotary inlet means, said cover means comprising an outer cover having an aperture and an inner cover disposed in said aperture, and fourth connecting means connecting said inner tube to said inner cover.

4,683,628
HEATABLE CALENDER ROLLER

Joachim Schönemann, Netphen, Fed. Rep. of Germany, assignor to Walzen-Irle GmbH, Netphen, Fed. Rep. of Germany

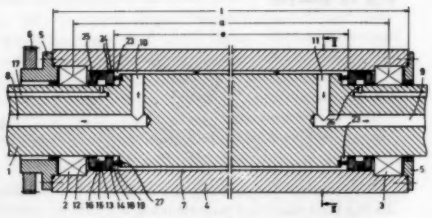
Filed Jan. 15, 1986, Ser. No. 819,172
Claims priority, application Fed. Rep. of Germany, Jan. 16, 1985, 8500950[U]
Int. Cl.[4] B21B 13/02, 31/08
U.S. Cl. 29—116 R 19 Claims

1. A calender roller, comprising:

a hollow cylindrical roller body defining an axis;

a stationary shaft connected to an inlet and an outlet for a thermal transmitting fluid and traversing said roller body so as to define with said roller body a gap for guiding the thermal transmission fluid;

bearing means connected to said shaft for bilaterally supporting said roller body; and

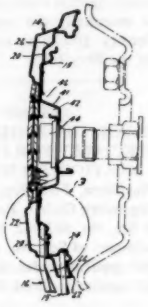


sealing means for sealing said bearing means against said gap, said shaft having opposing end positions accommodating a plurality of channels for allowing the thermal transmitting fluid to flow from the inlet via said gap towards the outlet said shaft being provided with a pair of circumferential strips extending in the direction of said axis and projecting towards said roller body to define a segmental gap.

4,683,629
SIMULATED WIRE WHEEL TRIM

Heinrich J. Hempelmann, Livonia, Mich., assignor to NI Industries, Inc., Novi, Mich.

Continuation-in-part of Ser. No. 688,328, Jan. 2, 1985. This application Apr. 23, 1985, Ser. No. 726,138
Int. Cl.[4] B21K 1/28
U.S. Cl. 29—159 A 9 Claims



1. A method of assembling a simulated wire wheel trim comprising an outer ring having a plurality of holes therethrough, a plurality of spokes, and a center assembly including an axially inner spoke retainer plate, and axially outer spoke retainer plate and a decorative outer plate member, said axially outer spoke retainer plate and said decorative plate member having a plurality of circumferentially spaced openings provided therein, said method comprising the steps of:

(a) positioning said axially outer spoke retainer plate on the center axis of said ring;

(b) inserting radially inner portions of said spokes into respective of said openings in said axially outer spoke retainer plate and said decorative plate member;

(c) aligning the radially outer ends of said spokes with respective of said openings in said outer ring;

(d) moving said spokes radially outwardly with respect to said openings in said axially outer spoke retainer plate so as to position the radially outer ends of said spokes within said openings in said outer ring; and

(e) assembling said axially inner spoke retainer plate to said

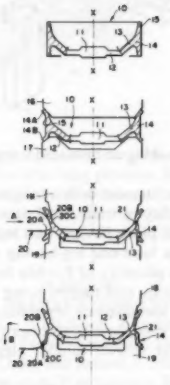
axially outer spoke retainer plate and said decorative plate member whereby radially inward movement of said spokes is restricted.

4,683,630

METHOD FOR MANUFACTURING AN INTEGRATED WHEEL

Akira Asari, Osaka; Takashige Yamamura; Shigeo Hattori, both of Kobe, and Tsuneya Ueno, Hyogo, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Dec. 19, 1985, Ser. No. 810,603
Claims priority, application Japan, Dec. 19, 1984, 59-269437
Int. Cl.[4] B21K *1/32*
U.S. Cl. 29—159.01 **3 Claims**



1. A method for manufacturing an integrated wheel for a vehicle, on which a tire is mounted, by a combination of die forging, press spreading and rotative ironing, wherein the method comprises:

integrally molding by die forging work a wheel disc with a peripheral thick tubular portion whose outer peripheral surface is made approximately parallel to the axial direction of the wheel and wherein said disc is spaced from opposite axial end edges of the tubular portion;

spreading said opposite axial end edges of said thick tubular portion in said diametrically outward direction by means of a press including first and second opposed press molds;

mounting said thick tubular portion on first and second spinning molds so as to bring said wheel into registration with a center portion of said spinning molds;

spinning said first and second spinning molds;

pressing a first rotative ironing tool against an axial intermediate portion of the spinning thick tubular portion for allowing material to escape in a first axial direction;

contour moving said first ironing tool in a second axial direction opposite said first axial direction so as to draw a first axial portion of said tubular portion; and

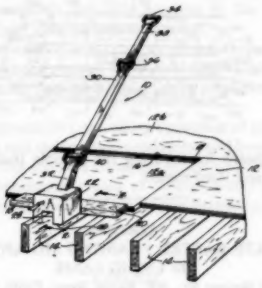
thereafter pressing a second rotative ironing tool against the tubular portion and contour moving the second tool in said first axial direction for drawing a second axial portion of said tubular portion.

4,683,631

TOOL FOR SEATING FLOORING PANELS

Dennis Dobbertin, 141 Morris St., Apt. #1, Pewaukee, Wis. 53072

Continuation of Ser. No. 759,869, Jul. 29, 1985, abandoned. This application Sep. 12, 1986, Ser. No. 908,399
Int. Cl.[4] B25B *27/02*
U.S. Cl. 29—278 **5 Claims**



1. A device for driving mating tongue and groove panels into a seated position for installation on parallel support members, said device including

a weighted head substantially heavier than a length of scrap lumber and having a generally flat, vertically extending rear face adapted to impact the outer edge of an elongated seating member resting on the support member and abutting an outer edge of the panel, said head including a bottom portion having an elongated groove for slidably receiving the upper portion of a support member and cooperating therewith to guide free back and forth movement of said head along the support member, said rear face extending generally perpendicularly to the direction of movement of said head;

an elongated handle having a lower end mounted on said head, said handle extending upwardly and rearwardly at an incline from said head and having a length sufficient to permit a user to stand in a position behind the outer edge of a panel and move said head back and forth along a support member;

a pair of axially-spaced hand grips on the upper portion of said handle for grasping by a user to push said head away from the seating member and to forceably pull said head toward the seating member to impact the seating member and drive a panel into a seated position; and

a hand grip located on the lower portion of said handle for grasping by a user to assist in balancing said head during installation onto and removal from a support member.

4,683,632

TRACK SUPPORT FOR SUPPORTING A FLEXIBLE TRACK

Peter Kalman, Pekin, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Sep. 9, 1985, Ser. No. 773,703
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—281.1 **7 Claims**

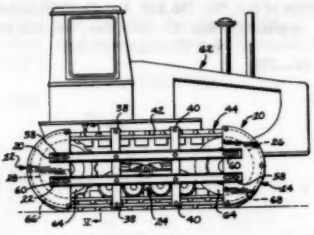
1. A track support for supporting a flexible oval track having first and second semi-circular end loops off of a vehicle, comprising:

a first end means for receiving the first semi-circular end loop of the flexible track;

a second end means for receiving the second semi-circular end loop of the flexible track;

a third brace means extending from the first end means to the second end means for supporting the first and second end

means and for maintaining them in engagement with the flexible track; and



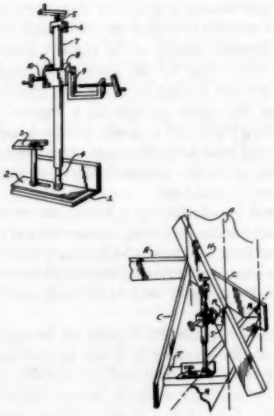
a fourth means for securing the flexible track to the first, second and third means.

4,683,633

ARTICULATE RAFTER FRAMING JIG AND METHOD OF USING SAME

J. Loris, 729 Beaver St., #E, Santa Rosa, Calif. 95404

Filed Feb. 26, 1986, Ser. No. 833,126
Int. Cl.[4] B23Q *17/00, 3/18, 1/04;* **B25B** *1/20*
U.S. Cl. 29—407 **2 Claims**



2. A method using a articulated jig for rafter framing comprising the steps of:

a. mounting the jig on the wall top plate

b. positioning said jig to accept various rafter stock

c. securing hip rafter stock in said jig for alignment so that upper end of said rafter rests on and directly over the junction of common rafters with ridge members and guided thereon by means on each side of said hip and lower end of said hip being held by said jig directly over but not touching final installation position of said hip on said top plate,

d. moving a vice with attached rafter clamp, up and down a pivotable support tube for holding and locking into position a slope adjustment of said hip,

e. holding of said hip by said jig for checking of square positioning of said hip to said top plate and plumb line,

f. adjusting said support tube with vice locked on said tube for controlling of said hip while horizontally aligning by means of said sliding plate and locking means,

g. providing means for transferring of ONE measurement from said common rafter to locate for marking of seat cut line on said hip with said jig holding said hip to correct slope with bottom center of said hip just clearing said top plate corner by said ONE dimension measurement, from side of common,

h. measuring of plumb line on side of said common a distance equal to that on said plumb line from said top plate surface along plumb line to top of said common for transferring to hip said one measurement for locating seat cut marking,

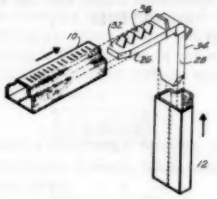
i. marking of said hip seat cut lines and locating of upper end cheek cuts by use of commons as guides.

4,683,634

METHOD OF MAKING AN INSULATED WINDOW SPACE ASSEMBLY

Richard D. Cole, 2392B Bedford Ave., Bellmore, N.Y. 11710

Continuation of Ser. No. 788,691, Oct. 18, 1985, abandoned, which is a division of Ser. No. 533,575, Sep. 19, 1983, abandoned. This application Apr. 25, 1986, Ser. No. 858,577
Int. Cl.[4] B23P *17/00*
U.S. Cl. 29—412 **12 Claims**



5. A method of making an insulated window spacer assembly comprising:

forming a tubular element with a longitudinal inner flat wall having a plurality of transversal grooves;

forming a corner piece having two legs joined at a preselected angle, at least one leg having a free end and a flat surface with a plurality of flexible fingers extending outwardly therefrom, said fingers being spaced at a distance different than the distance separating said grooves, said leg having a cross-sectional external size exceeding a correspondingly shaped tubular element cross-sectional inside size;

cutting said tubular element transversally into tubular members of preselected lengths, independently of the positions of said grooves; and

joining two of the members by said corner piece by inserting the legs into the members, whereby an interference fit is formed between the one leg and the corresponding member with some of the fingers engaging some of the grooves to interlock same and prevent separation.

4,683,635

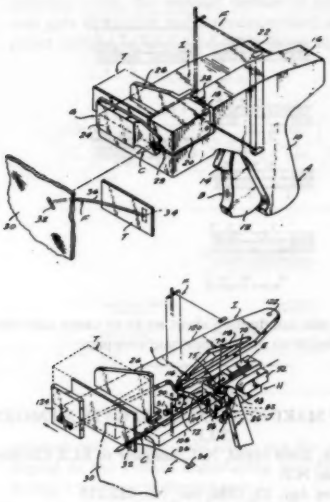
TAG DISPENSING AND ATTACHING METHOD AND APPARATUS

Daniel Duchin, Long Island City, N.Y., assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 654,062, Sep. 25, 1984, Pat. No. 4,610,384, which is a continuation-in-part of Ser. No. 553,080, Nov. 18, 1983, Pat. No. 4,610,385. This application Feb. 14, 1986, Ser. No. 829,579
Int. Cl.[4] B23P *11/00*
U.S. Cl. 29—432 **9 Claims**

1. Method of attaching tags to merchandise using fasteners, with each fastener having a bar section and a button section joined by a filament section, comprising the steps of: providing a hand-held tag attacher having a manually engageable handle, a hopper adapted to receive a stack of tags, and a feed pin movably mounted on a slide, applying a force to the feed pin for moving the feed pin to a stop position at a predetermined acute angle of attack with respect to the tag and for thereafter

moving the pin and the slide to move the tag to an attaching position while maintaining the feed pin at the predetermined angle of attack, the tag being in alignment with a needle having a needle bore and a side opening when the tag is at the attaching position, making a hole in the tag by driving the needle through the tag at the attaching position, inserting the needle through the merchandise, and driving a bar section of a fastener through the needle bore, the tag and merchandise while the related filament section extends through the side opening.

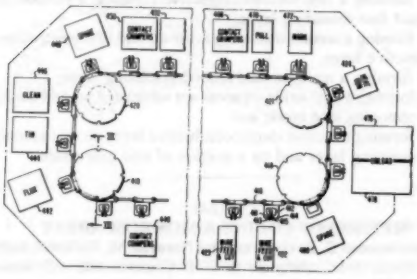


4,683,636

WIRE PREPARATION SYSTEM

James A. Henderson, Finksburg; Constantine M. Travlos, Baltimore; David S. Ferris, Annapolis, all of Md.; Gerald J. Duddy, Thousand Oaks, and Roland F. Mercier, Los Angeles, both of Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 13, 1984, Ser. No. 670,695
Int. Cl.[4] B23P *23/00*
U.S. Cl. 29—564.6 **2 Claims**



1. A system for automatically preparing a section of wire having a predetermined length and with preselected end terminations for use as an electrical connection between spaced apart terminals of an electrical system comprising:

(a) bulk storage means for storing wire exceeding said predetermined length;

(b) means for removing and cutting to said predetermined length wire from said bulk storage means, with the respective wire ends extending in a common generally parallel direction for presentation at a wire preparation workstation means;

(c) wire transport means which receives the removed and cut to predetermined length wire from said bulk storage means, and for transporting the said wire to a wire preparation workstation means, which wire transport means includes first and second wire end support clamps which are independently movable traverse to the direction of travel of said wire transport means;

(d) wire preparation workstation means operative for performing predetermined wire end termination task upon the wire ends presented at said wire preparation workstation means;

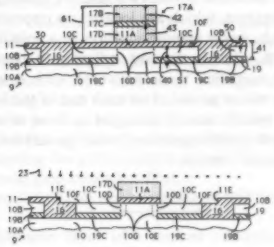
(e) control means for controlling operation of said means for removing and cutting said predetermined length wire, and for operating the wire transport means and the wire preparation workstation means to automatically prepare said predetermined length of wire with preselected end termination.

4,683,637

FORMING DEPTHWISE ISOLATION BY SELECTIVE OXYGEN/NITROGEN DEEP IMPLANT AND REACTION ANNEALING

Charles J. Varker, Scottsdale; Syd R. Wilson, and Marie E. Burnham, both of Phoenix, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 7, 1986, Ser. No. 826,951
Int. Cl.[4] H01L *21/265, 7/54*
U.S. Cl. 437—63 **7 Claims**



1. A process for forming a semiconductor device, comprising:

providing a single crystal semiconductor substrate having a first surface;

forming on said surface a conductor means having a first predetermined thickness and overlying a first region of said substrate and not overlying a second region of said substrate;

implanting oxygen or nitrogen into a first part of said second region of said substrate and into said conductor means to a dose exceeding about 1×10^{18} ions/cm^2 at an energy sufficient to penetrate into said substrate to a first predetermined depth and to penetrate into said conductor means to a second predetermined depth less than said first thickness;

heating said substrate and said conductor means to react said implanted oxygen or nitrogen to form a first buried dielectric at said first depth in said second region and a second buried dielectric at said second depth in said conductor means;

etching away a first part of said conductor means above said second buried dielectric to leave said second dielectric and a second part of said conductor means below said second dielectric; and

thereafter etching away said second buried dielectric.

4,683,638

MACHINE TOOL

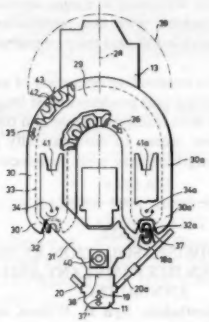
Hans-Henning Winkler, Tuttlingen, and Eugen Rütschle, Mühlheim, both of Fed. Rep. of Germany, assignors to Chiron-Werke GmbH, Tuttlingen, Fed. Rep. of Germany

Filed Jun. 10, 1986, Ser. No. 872,696

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1985, 3521009

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 **14 Claims**



1. Machine tool comprising a spindle stock, a tool magazine having an endless path along which a plurality of tool-carrying toolholders are displaceable in a plane perpendicular to the axis of the spindle stock, and two gripper arms for transferring the toolholders between withdrawal and/or loading positions in the tool magazine, which are located on opposite sides of the spindle stock, and a spindle position in a spindle nose of the spindle stock, wherein the said endless path extends along a U shape, said magazine being provided with a withdrawal or mounting position provided on each end of the legs of the said U, and the spindle nose is arranged in front of and below the said ends and rigidly connected with the said tool magazine in the direction of the axis.

4,683,639

METHOD OF MANUFACTURING AN ELECTROLYTIC DOUBLE-LAYER CAPACITOR

Michinobu Maesaka; Koichi Watanabe, and Michihiro Murata, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed May 7, 1986, Ser. No. 860,536

Claims priority, application Japan, May 11, 1985, 60-100155

Int. Cl.[4] H01G *9/00*

U.S. Cl. 29—570.1 **5 Claims**

1. A method of manufacturing an electrolytic double-layer capacitor comprising the steps of:

preparing a flat-shaped compact of carbonaceous material having a recess portion formed therein;

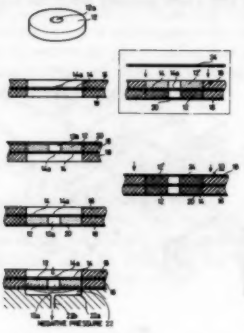
preparing an ion-permeable separator having a region provided with no liquid column of an electrolytic solution in a position corresponding to said recess portion of said compact;

preparing a conductive sheet;

preparing an insulating member having a central aperture for defining a space for containing said compact;

forming a laminated intermediate member in which said insulating member is interposed between said separator and said conductive sheet to define said space for containing said compact; and

dripping said electrolytic solution from above said region of said separator provided with no liquid column and then



deforming said conductive sheet so as to cause said electrolytic solution to impregnate said compact.

4,683,640

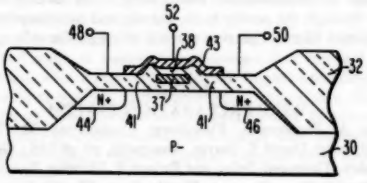
METHOD OF MAKING A FLOATING GATE MEMORY CELL

Lorenzo Faraone, Belle Mead, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 15, 1986, Ser. No. 852,215

Int. Cl.[4] H01L *21/441, 21/425*

U.S. Cl. 437—41 **12 Claims**



1. A method of making a floating gate storage device comprising the steps of:

(a) forming a first insulating layer on a semiconductor substrate;

(b) forming a first electroconductive layer on a portion of said first insulating layer;

(c) forming a second insulating layer on said first electroconductive layer;

(d) forming a mask on said second insulating layer;

(e) forming a gate oxide on areas not subtended by said mask;

(f) removing said mask; and

(g) forming a second electroconductive layer on said second insulating layer and on a portion of said gate oxide.

4,683,641

METHOD OF CODING A MOS ROM ARRAY

Kothandaraman S. Ravindhran, and Narayan M. Kulkarni, both of Mesa, Ariz., assignors to GTE Communication Systems Corp., Phoenix, Ariz.

Continuation-in-part of Ser. No. 519,299, Aug. 1, 1983, abandoned. This application Apr. 8, 1986, Ser. No. 851,292

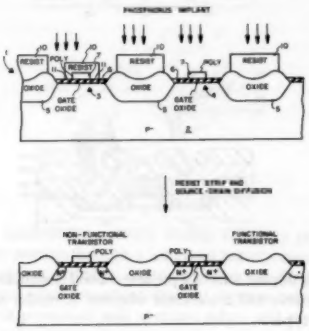
Int. Cl.[4] H01L *21/425*

U.S. Cl. 437—41 **11 Claims**

1. A method of producing a ROM from a partially processed semiconductor wafer comprising a substrate, a plurality of spaced regions separated by regions of isolating oxide grown in

said substrate, a layer of gate oxide overlaying each of said spaced regions and a gate electrode overlaying each layer of said gate oxide, comprising the steps of:

depositing a protective layer of material on a predetermined area of the exposed surface of each of said regions of isolating oxide, the exposed surface of selected ones of said gate electrodes and a predetermined area of the exposed surface of said gate oxide layer adjacent to said



selected ones of said gate electrodes for preventing the doping of the surface underlaying said protective layer during a subsequent doping step;

doping the exposed surface of said wafer in the areas between said protective layer;

removing said protective layer of material from the surfaces covered thereby; and

diffusing said doped areas for forming source and drain regions under nonselected ones of said gate electrodes.

4,683,642

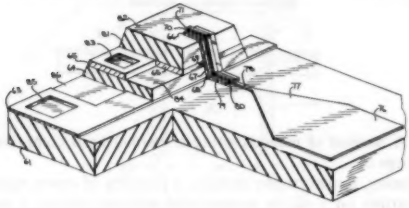
METHOD FOR FABRICATING MOMS SEMICONDUCTOR DEVICE

Joseph A. Calviello, Kings Park, N.Y., assignor to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 683,686, Dec. 19, 1984, Pat. No. 4,631,560. This application May 15, 1986, Ser. No. 863,797

Int. Cl.[4] H01L *21/461, 21/441, 49/02*

U.S. Cl. 437—40 **5 Claims**



1. A method for making an MOMS semiconductor device comprising:

forming a plurality of mesa stacked horizontal layers including at least one semiconductor layer;

defining a mesa having a generally vertical side to expose the edge of said semiconductor layer;

forming a first metal layer having a generally vertical portion extending along said side of said mesa over said exposed edge of said semiconductor layer;

forming a surface oxide layer on said first metal layer; and

forming a second metal layer on said oxide layer.

4,683,643

METHOD OF MANUFACTURING A VERTICAL MOSFET WITH SINGLE SURFACE ELECTRODES

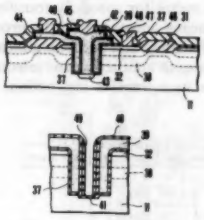
Shigeru Nakajima, Chigasaki; Kazushige Minegishi, Atsugi; Kenji Miura, Isehara; Takashi Morie, and Toshifumi Somatani, both of Zama, all of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Filed Jul. 16, 1985, Ser. No. 756,135

Claims priority, application Japan, Jul. 16, 1984, 59-146037

Int. Cl.[4] H01L *21/385, 21/388, 21/40, 29/78*

U.S. Cl. 437—203 **12 Claims**



1. A method of manufacturing a vertical metal oxide semiconductor field effect transistor, comprising the steps of:

forming a trench in a major surface of semiconductor substrate of a first conductivity type, said trench having a side wall surface substantially perpendicular to said major surface of said semiconductor substrate, and said trench being formed in a region adjacent to a source or drain region in said semiconductor substrate;

forming a gate insulating film on the side wall surface and the bottom of said trench;

forming a first conductive layer over said gate insulating film along an inner wall surface and the bottom of said trench so as not to completely fill said trench with said first conductive layer, a portion of said first conductive layer extending above said major surface;

removing those portions of said first conductive layer and said gate insulating film overlying the bottom of said trench excepting the bottom edges of said first conductive layer and said gate insulating film;

forming an insulating film on the surface of said first conductive layer;

forming a diffusion layer of a second conductivity type below the bottom of said trench; and

forming an electrode pattern with those portions of said first conductive layer extending above said major surface.

4,683,644

AUTOMATED ASSEMBLY SYSTEM FOR SEMICONDUCTOR DEVICE

Kohsuke Tange; Osamu Takahashi; Yuhki Furuya, and Akira Harada, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 15, 1985, Ser. No. 754,960

Claims priority, application Japan, Jul. 16, 1984, 59-146086

Int. Cl.[4] H01L *21/58, 21/60;* **B23P** *21/00*

U.S. Cl. 437—7 **2 Claims**

1. An automated semiconductor assembly system, comprising:

die bonding means for mounting an IC die on a lead frame;

receiving, connecting and inserting means for receiving the frame from the die bonding means, connecting the IC die to a lead portion of the lead frame with a wire to form an unmolded semiconductor product, and inserting the unmolded semiconductor product into a magazine having holes formed in a plate thereof, the holes representing in binary digits an identification number of the magazine;

first support means for supporting the unmolded semiconductor product during a period of quality checking;

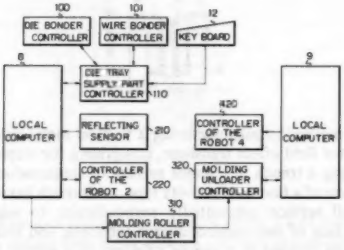
molding means for sealing the unmolded semiconductor product in a resin to form an unhardened molded product;

first robot means for roboticly transferring the magazine from one to another of said receiving, connected and inserting means, said first support means and said molding means, said first robot means including a first reflecting sensor for reading out the identification number of the magazine;

heating and hardening means for heating the magazine and the molded product therein to harden the unhardened molded product into a hardened molded product;

second support means for supporting the magazine;

second robot means for roboticly transferring the magazine from one means selected from the group of said molding means, said heating and hardening means and said second support means to another means selected from said group in response to a transfer instruction, said second robot



means having a second reflecting sensor for reading out the identification number of the magazine;

control means, communicating with each of said die bonding means, said receiving, connecting and inserting means, said molding means, said first and second supporting means, said first and second robot means and said heating and hardening means, for controlling each of said die bonding means, said receiving, connecting and inserting means, said molding means, said first and second supporting means, said first and second robot means and said heating and hardening means, and for correlating the identification number of the magazine with a lot number of the lead frame in the magazine which lot number is input to the control means, and storing the correlation of the lot number and the identification number in said control means; and

means for inputting the lot number into said control means.

4,683,645

PROCESS OF FABRICATING MOS DEVICES HAVING SHALLOW SOURCE AND DRAIN JUNCTIONS

Hussein M. Naguib, Fremont, Calif.; Iain D. Calder, Nepean, Canada; Vu Q. Ho, Kanata, Canada, and Abdalla A. Naem, Ottawa, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Dec. 24, 1985, Ser. No. 813,232

Claims priority, application Canada, Jun. 28, 1985, 485874

Int. Cl.[4] H01L *21/265, 29/78*

U.S. Cl. 437—41 **3 Claims**

1. A process for the fabrication of an MOS semiconductor device comprising:

forming on a silicon substrate regions of field oxide;

forming at a region not occupied by field oxide a gate oxide layer;

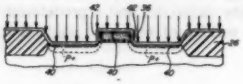
forming a device gate over a region of said gate oxide layer;

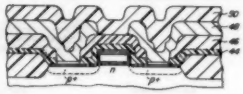
designating source and drain areas and removing gate oxide at said source and drain areas;

depositing a refractory metal on the silicon substrate at said source and drain regions;

implanting germanium ions at the source and drain areas to mix silicon and the refractory metal at an interface therebetween;

implanting silicon ions at the source and drain areas to cause amorphization of the silicon to a predetermined depth; and





implanting dopant ions of a predetermined conductivity type at the source and drain areas whereby to render said areas of said type.

4,683,646

THERMAL HEAD METHOD OF MANUFACTURING

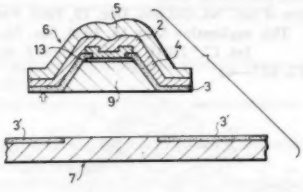
Giichi Kando, Morioka, and Makoto Tomoyori, Iwate, both of Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Aug. 28, 1985, Ser. No. 770,652

Claims priority, application Japan, Aug. 28, 1984, 59-178859

Int. Cl.[4] H05B *3/00;* **G01D** *15/10;* **B05D** *1/36*

U.S. Cl. 29—611 **1 Claim**



1. A method of manufacturing a thermal head comprising the steps of:

forming, by anistrophy etching, a plurality of center-raised stripes on a silicon monocrystal substrate having a face with anisotropy or selectivity with respect to etching;

forming at least a heating resistor film, a conductor film and a protection film on the surface of each of said center-raised stripes of said substrate;

making said plurality of center-raised stripes independent from each other by etching a face of said substrate opposite to the face on which said films are formed;

dividing the portion on which said films are formed for every center-raised stripe into heating portions; and

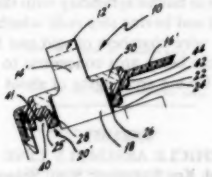
connecting conductors of each of said heating portions to respectively corresponding lead wires of a lead wire portion prepared separately from said heating portion by forming said lead wires on an electrically insulating substrate.

4,683,647

POST SEAL AND METHOD OF MANUFACTURE FOR LEAD-ACID BATTERIES

William B. Brecht, Hatfield, and Sudhan S. Misra, Lansdale, both of Pa., assignors to C & D Power Systems, Inc., Plymouth Meeting, Pa.

Filed Apr. 7, 1986, Ser. No. 849,184
Int. Cl.[4] H01M *2/30*
U.S. Cl. 29—623.2 **15 Claims**



1. A method for securely sealing a battery post within an aperture passing through a lead-acid battery case, comprising:

a. applying a rubber undercoat which is devoid of rubber fillers annularly about the battery post portion which is most proximate said aperture when said post is securely sealed within said aperture;

b. positioning said post within and annularly spaced from said aperture with said annular undercoat proximate said aperture;

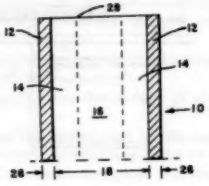
c. filling space within said aperture between said annular undercoat and said battery case with a rubber bonding epoxy material thereby bonding to said annular undercoat and to said battery case.

4,683,648

LEAD-TITANIUM, BIPOLAR ELECTRODE IN A LEAD-ACID BATTERY

Lun-Shu R. Yeh, Summit; Morten Grenness, Califon, and Robert J. Fuller, Hackettstown, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Division of Ser. No. 684,755, Dec. 21, 1984, Pat. No. 4,637,970.
This application Oct. 2, 1986, Ser. No. 914,422
Int. Cl.[4] H01M *4/16*
U.S. Cl. 29—623.5 **11 Claims**



1. A method for producing an electrode for generating electrical power in an electrochemical cell apparatus, comprising the steps of:

(a) placing a core portion composed of titanium in a plating bath which contains dissolved lead (Pb) ions; (b) electroplating said dissolved lead onto one or more faces of said core portion member to produce a substantially non-porous, continuous layer of lead on said core portion faces; and

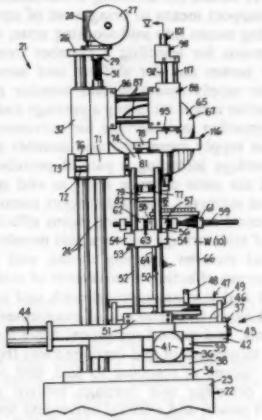
(c) heating said electroplated core portion to diffuse said lead into said core portion a limited distance which leaves a residual layer in said core portion that contains substantially zero lead.

4,683,649

DEVICE FOR ASSEMBLING RETURN BEND TO COIL

Carlo Sbalchiero, Fagagna, and Brazzale Giorgio, Creazzo, both of Italy, assignors to Burr Oak Tool & Gauge Co., Sturgis, Mich.

Filed Jun. 11, 1984, Ser. No. 618,972
Int. Cl.[4] B23P *15/26*
U.S. Cl. 29—726 **9 Claims**



1. An assembly device for assembling a member having plural and spaced end segments thereon to a workpiece having plural and spaced sets of end segment receiving means thereon, with at least some of the sets of end segment receiving means being oriented at an angle to other of said sets of end segments, a spacing between said end segment receiving means in each set corresponding to the spacing of said end segments from each other, comprising:

frame means;

workpiece support means, mounted on said frame means and movable in at least two perpendicularly related directions defining a plane, to bring each set of end segment receiving means into a working zone;

workpiece holder means to hold said workpiece fixedly on said workpiece support means and to assure movement of said workpiece with said workpiece support means;

member supply means mounted on said frame means;

member transport means for transporting a member from said member supply means to a workpiece mounted on said workpiece support means, said member transport means including the following:

member gripping means to grip and hold said member in an initial first oriented position relative to a workpiece mounted on said workpiece support means and relative to said plural and spaced end segment receiving means on said workpiece;

first drive means for orienting said member gripping means about an axis of rotation perpendicular to said plane, so that a selected one of the spaced end segments of said member becomes aligned with a selected one of said plural and spaced end segment receiving means on said workpiece;

second drive means for effecting a movement of said member gripping means perpendicular to said plane between first and second positions corresponding to toward and away from, respectively, the workpiece on said workpiece support means, so that a movement of said member gripping means to said first position effects a delivery of said member to said working zone and a simulaneous insertion of said end segments thereon into said end segment receiving means;

release means for effecting a release of the holding relation

between said member gripping means and said member in response to said member gripping means attaining said first position, sequentially followed by a movement, caused by said second drive means, of said member gripping means away from said first position toward said second position without a member held therein, and by a reorientation, caused by said first drive means, of said member gripping means about said axis of rotation to said initial first oriented position thereof;

third drive means for effecting a movement of said workpiece support means to bring a set of open end segment receiving means into said working zone; and

carrier means for selecting a member from said member supply means and for shifting said member from said member supply means to said member gripping means, said carrier means including a carriage and support means for supporting said carriage for movement between said member supply means and said member gripping means, said carriage including a pair of protuberances thereon spaced the same distance apart as said spacing between said end segments, and said support means including first and second reciprocal drive means effecting said movement of said carriage between said member supply means and said member gripping means, said first reciprocal drive means effecting a movement of said protuberances toward and into engagement with said end segments as well as away from and out of engagement with said end segments, said second reciprocal drive means effecting a lateral movement of said carriage away from said member supply means in response to said first reciprocal drive means orienting said carriage toward said workpiece support means, and a lateral movement toward said member supply means in response to said first reciprocal drive means orienting said carriage away from said workpiece support means.

4,683,650

DEVICE FOR THE INSTALLATION OF THE COILS INTO THE STATOR OF ELECTRICAL MACHINES

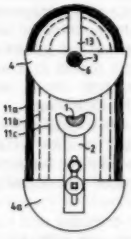
Franz Veser, Kanalstrasse 16, 7980 Ravensburg Bundesrepublik, Fed. Rep. of Germany

Filed Oct. 29, 1985, Ser. No. 792,557

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1984, 3439769

Int. Cl.[4] H02K *15/06*

U.S. Cl. 29—736 **8 Claims**



1. In a device for the production, transfer and installation of interconnected coils into the stator of an electrical machine, the interconnected coils being machine-fabricated in sets by means of semi-circular winding formers with wire chambers stepped in correct polarity and the formers being arranged axially extractably on carrying bars which are secured parallel to the rotational axis on rotary arms of a winding machine such that the formers can be turned after release of a rotational lock, with the winding diameters of the formers being equivalent to the chord lengths between the corresponding stator grooves, and the coil sets taken off the formers being installed into the stator by means of elastically spreadable installation strips inserted in groups between the groove heads, the improvement wherein said formers comprise two mutually opposite former sets, each having a mid-axis, a sectional plane and a step profile, with a former-free space being provided adjacent each former set, and said device further comprises a support element associated with at least one said former set for dimensionally stable transfer of a coil set from the winding machine to the stator, said support element extending radially in the mid-axis of said one former set and perpendicular to the sectional plane of said one former set and protruding into the former-free space adjacent said one former set, said support element having supporting faces which are in mirror symmetry with the step profile of said one former set and having step radii which are equivalent to the radii of the wire chambers of said one former set, and said supporting faces being arcs concentric to the axis of the coil windings and having arc lengths of about 10°.

4,683,651

VEHICLE ASSEMBLY LINE

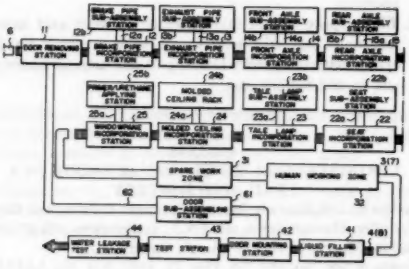
Toshinobu Taketani; Ken Kuramori; Sunji Sakamoto, and Hiroshi Fujii, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

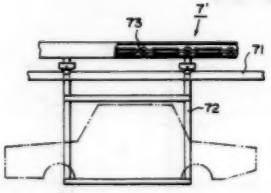
Filed Jul. 8, 1985, Ser. No. 752,558

Claims priority, application Japan, Jul. 9, 1984, 59-142848; Jul. 9, 1984, 59-142849; Jul. 9, 1984, 59-142850; Jul. 9, 1984, 59-142851

Int. Cl.[4] B23P *21/00, 19/00*

U.S. Cl. 29—786 **11 Claims**





1. A vehicle assembly line along which stations for automated assembly steps using automatic machines such as robots and for manual assembly steps are formed intermixed with each other, comprising an automated assembly line portion, the automated assembly line portion being formed of train type conveyors, said train type conveyors each including at least one work supporting member being movable along a track and where each work supporting member includes a driving mechanism and control means so the conveyor can be moved in either indexing feed fashion or in continuous feed fashion wherein automated stations for automated steps and manual stations for scheduled-to-be-automated steps are included along the automated assembly line portion, the work being fed in indexing feed fashion at said automated stations and the work being fed in continuous feed fashion at the manual sta-

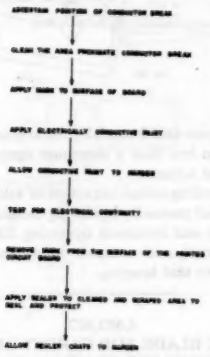
tions, the automation of said manual stations scheduled-to-be-automated being facilitated by the capability of said train type conveyors to be changed from feeding the work in said continuous feed fashion to said indexing feed fashion.

4,683,652

PRINTED CIRCUIT REPAIR PROCESS

Jerry L. Hatfield, P.O. Box 6041, Lakeland, Fla. 33803

Filed Aug. 22, 1986, Ser. No. 899,091
Int. Cl.[4] H05K *3/00*
U.S. Cl. 29—829 **8 Claims**



1. A method of repairing an electrical conductor path interruption on a thin printed circuit board in the presence of heat sensitive electrical components comprising the steps of:

ascertaining the position of the electrical conductor path interruption along the electrical conductor path;

cleaning the area proximate the electrical conductor path interruption to expose the electrical conductor strip and to remove any dielectric material thereat which would interfere in electrical conductivity;

applying a mask to the surface of the printed circuit board in a manner substantially parallel to the electrical conductor path and on each side of the electrical interruption adjacent the cleaned area for providing a channel which includes the electrical interruption along the electrical conductor path;

applying at least one coat of an electrically conductive paint within and along the channel to bridge the electrical conductor path interruption thereby reestablishing the electrical conductor path;

allowing the applied electrically conductive paint to harden;

testing for electrical continuity;

removing the mask from the surface of the printed circuit board;

applying at least one sealer coat to the area proximate the applied electrically conductive paint to seal and protect the electrically conductive paint and the area proximate the conductive paint; and

allowing the sealer coats to harden thereby repairing the electrical conductor path interruption.

4,683,653

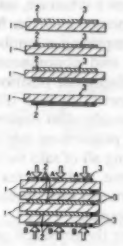
METHOD FOR PRODUCING A MULTILAYER PRINTED-CIRCUIT BOARD

Yamahiro Iwasa, Hachioji, Japan, assignor to Asahi Chemical Research Laboratory Co., Ltd., Japan

Filed Dec. 9, 1985, Ser. No. 806,450
Claims priority, application Japan, Dec. 31, 1984, 59-278116
Int. Cl.[4] H05K *3/36*
U.S. Cl. 29—830 **2 Claims**

1. A method for producing a multilayer printed-circuit board using an electrically conductive copper paste including 70–85% by weight of copper powder, 15–30% by weight of at least one resin selected from the group of phenol resin, epoxy resin, polyestel resin and xylene resin, and a specific additive selected from anthracene and the derivative thereof, the method comprising the steps of:

Printing the electrically conductive copper paste in a desired circuit pattern on at least one side of each of a predetermined number of electrically insulated prepreg base plates of epoxy resin;



drying the base plates by heating the base plates at approximately 80° C. for approximately 30 minutes to harden the base plates and the copper paste;

laminating the base plates by pressing the base plates together and heating the base plates at approximately 170° C. for approximately 30–60 minutes to additionally harden and fixedly attach the base plates to each other and thereby form a single multilayer printed-circuit board; and

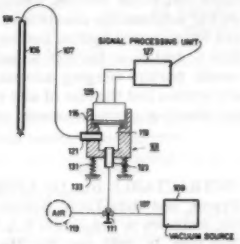
electrically connecting the multilayer printed circuits of the multilayer printed-circuit board.

4,683,654

METHOD OF AND DEVICE FOR SENSING THE PRESENCE OR ABSENCE OF AN ARTICLE AT THE END OF A VACUUM PICK-UP MEANS

Gerard J. Scholten; Theodorus J. G. Beurskens, and Mathias F. Videc, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 600,198, Apr. 13, 1984, abandoned, which is a continuation of Ser. No. 441,579, Nov. 15, 1982, abandoned. This application Apr. 14, 1986, Ser. No. 852,091
Claims priority, application Netherlands, Apr. 13, 1982, 8201532
Int. Cl.[4] H05K *3/30*; B23P *19/00*; G01M *3/02*
U.S. Cl. 29—832 **7 Claims**



1. A method of sensing the presence or absence of an article at the end of a vacuum pick-up means connected to a vacuum source for the pick-up, transport and placement of an article the article being picked up and retained by said pick-up means under the influence of the vacuum created by said vacuum source and being released when said vacuum is interrupted or removed by using the difference in the vacuum occurring in the presence and absence of said article at an end of said pick-

up means to generate an acousitc test signal, comprising the steps of:

creating a turbulence in the air flow produced by said vacuum in the absence of said article, converting said turbulent air flow into an acoustic signal, amplifying said acoustic signal and then converting said amplified acoustic signal into an optical, electrical or further acoustical signal, said signal being indicative of the absence of said article on the end of said vacuum pick-up means.

4. A device for positioning a number of electrical and/or electronic components on a substrate, said device comprising a frame to which are connected a carrier for said substrate and a transfer mechanism, comprising a number of vacuum pick-up means for transferring said components from a component pick-up position to a placement position on said substrate, a drive mechanism connected to said transfer mechanism for removing said tranfer mechanism between said pick-up position and said placement position on said substrate, and a single common valve connecting all of said vacuum pick-up means to a common vacuum source, and a vortex chamber for generating a sound position between said vacuum pick-up means and said common vacuum source.

6. A device for sensing the presence or absence of an article at the end of a vacuum pick-up means, which device has at least one displaceable vacuum pick-up means connected to a common vacuum source by means of a flexible connection, and a valve for establishing and interrupting the connection between said pick-up means and said common vacuum source, characterized in that a vortex chamber for generating an audible sound is positioned in said felxible connection.

4,683,655

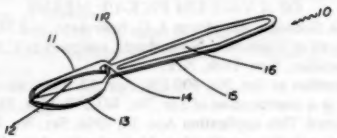
CITRUS FRUIT PEELER

Irving J. Bissell, P.O. Box 6506, Fort Lauderdale, Fla. 33316

Continuation-in-part of Ser. No. 638,204, Aug. 6, 1984, abandoned. This application Jul. 15, 1985, Ser. No. 754,839

Int. Cl.[4] A47J *17/04*

U.S. Cl. 30—123.7 **8 Claims**



1. A device for rapidly peeling citrus fruit having a rind, comprising: an essentially horizontal flat longitudinally extending stabilizer portion having a front and rear; an elongated essentially vertical flat blade portion which extends downwardly from and is substantially coextensive with said stabilizer portion and has a curved bottom cutting edge extending between the ends of said blade portion; an angular essentially vertical rear handle portion merging into said stabilizer portion; said handle portion and the rear of said stabilizer portion forming an open thumb-engaging abutment means.

4,683,656

RETRACTABLE BLADE KNIFE

Jean-Claude Peyrot, and Jean-Louis Bonnard, both of Bordeaux, France, assignors to Preposreve S.A.R.L., France

Filed Mar. 21, 1985, Ser. No. 714,446

Int. Cl.[4] B26B *3/06*

U.S. Cl. 30—162 **6 Claims**

1. A knife comprising:

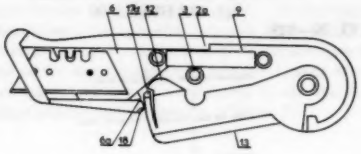
a handle;

a blade carrier disposed to slide axially within said handle, said blade carrier exhibiting an inclined rear edge;

a blade connected to said blade carrier;

manually operating means for axially deploying said blade, said manually operating means comprises an actuator to be at least partially retracted into said handle and means for cooperating with said inclined rear edge to convert movement of said actuator into axial displacement of said blade upon retracting said actuator into said handle, wherein said means for cooperating slides on said inclined rear edge upon movement of said actuator;

means for exerting a force to retract said blade into said



handle wherein said force fully retracts said blade into said handle when less than a minimum operating force is exerted on said actuator;

means for impeding initial retraction of said actuator, associated with said manually operating means, wherein a force greater than said minimum operating force is required to initially retract said actuator when said blade is fully retracted into said housing.

4,683,657

CUTTING BLADE FOR CARPET REMOVING MACHINES

Lloyd E. Anderson, 6408-74th Ave. N., and Martin L. Anderson, 4417 Third St. NE., both of Minneapolis, Minn. 55428

Filed Mar. 10, 1986, Ser. No. 838,154

Int. Cl.[4] A47L *11/12*

U.S. Cl. 30—170 **1 Claim**

1. A worn carpet removal machine comprising, in combination:

(a) a motorized carpet stripper machine having a generally flat, rectangular, floor-engaging blade member with a chisel-shaped cutting edge formed on the working surface thereof and mounted for oscillating orbital motion with said floor engaging blade at a predetermined angle relative to the horizontal; and

(b) a cutting blade having a sharpened edge, said cutting blade being adjustably secured to said floor-engaging blade and having a portion extending vertically upwardly therefrom and a portion extending vertically downwardly therefrom at generally a right angle and located adjacent a side edge thereof with said sharpened edge pointing toward and of an adjustable distance from said chisel-shaped cutting edge of said floor-engaging blade, said cutting blade operative to slice through the thickness dimension of the carpet as it is loosened from the floor by

said floor-engaging blade with said predetermined angle precluding the downwardly extending portion of said cutting blade from contacting the floor.

4,683,658

MANUALLY CONTROLLABLE MACHINE SUCH AS A FABRIC CUTTING MACHINE

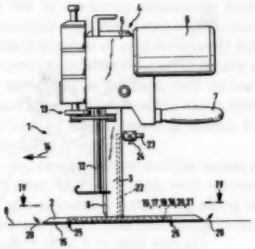
Gunter O. Stumpf, Bad Urach, Fed. Rep. of Germany, assignor to Gunter O. Stumpf GmbH & Co. KG, Mehrstetten, Fed. Rep. of Germany

Filed Mar. 1, 1985, Ser. No. 707,053

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1984, 3413346

Int. Cl.[4] B26B *7/00*

U.S. Cl. 30—275 **12 Claims**



1. A manually controllable machine for cutting or notching fabric, comprising:

a body;

a blade connected to the body to cut or notch fabric;

a supporting foot connected to the body for supporting the machine on a fabric cutting table, the supporting foot including

(i) a flat bottom face, and

(ii) a plurality of air outlets in the bottom face;

a central air distribution chamber;

means in fluid communication with the distribution chamber for conducting compressed air thereto; and

a plurality of air paths extending between and in fluid communication with the air outlets and the air distribution chamber, each air path being adapted to conduct pressurized air from the distribution chamber to a respective one of the air outlets, all of the air paths having the same, preset length to help equalize the pressure of the air discharged through the respective air outlets.

4,683,659

CHAIN SAW WITH OIL PUMP HAVING A PLUNGER PISTON

Steffen Wünsch, Holzgerlingen; Günter Zilly, and Helmut Schneider, both of Leinfelden-Echterdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

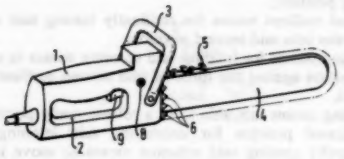
Filed Apr. 11, 1986, Ser. No. 851,323

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1985, 3527024

Int. Cl.[4] F16N *13/14*

U.S. Cl. 30—381 **7 Claims**

1. In a hand-held chain saw comprising a housing with an oil pump positioned in said housing and formed with a cylindrical pump chamber being filled with oil and having an inlet opening and an outlet opening; a rotatable plunger piston immersed in said chamber and having ports adapted to selectively communicate with said inlet opening and said outlet opening upon rotation of said plunger; a rotatable gear rigidly connected to said piston and driven by a drive means to rotate said piston, said gear having an oblique end face wobbling upon the rotation of the gear; and support means, said end face being supported against said support means at various radial distances from an axis of elongation of said piston and to impart to said piston an axial movement which superimposes its rotation to effect a pumping action and dosing of the oil being pumped, said support means being immovably supported in said housing in the direction of elongation of said piston but being adjustable in said housing in the direction transversal to said direction of elongation, the improvement comprising spring means acting on said gear to bias said end face against said support means, said oblique end face facing said pump chamber and, said



support means including a ball positioned against said end face, and a flange bolt formed with a recess accommodating said ball and having an external portion which is actuated from outside of said housing to turn said flange bolt about an axis thereof and to adjsut said ball in a radial direction of said piston, said ball being positioned in said flange bolt so that upon turning of said bolt by said external portion said ball can be displaced over an adjustment path which is greater than a diameter of said piston.

4,683,660

CHAIN SAW HAVING A BRAKING ARRANGEMENT

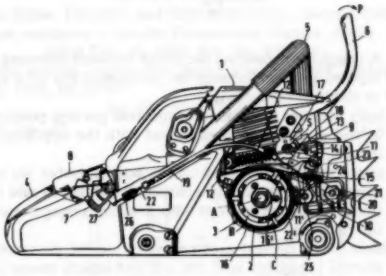
Volker Schurr, Schwieberdingen, Fed. Rep. of Germany, assignor to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Aug. 9, 1985, Ser. No. 764,221

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1984, 3430840

Int. Cl.[4] B27B *17/02*

U.S. Cl. 30—382 **18 Claims**



1. A handheld, motor-driven chain saw comprising:

a motor housing having a handle;

a guide bar mounted on said housing for accommodating a saw chain therein;

a brake arrangement including:

a brake drum operatively connected to the saw chain;

a brake band disposed in surrounding relationship to said brake drum;

brake band holding means connected to said brake band and being mounted on said housing for movement between an inactive position whereat said brake band is disposed in spaced relationship to said brake drum and a braking position whereat said brake band is drawn tightly around said brake drum;

first resilient means for resiliently retaining said brake band holding means in said braking position;

manually displaceable means connected to said brake band holding means for moving and holding the latter in said inactive position against the force of said first resilient means thereby disengaging said brake band from said brake drum and to again cause said brake band to engage said brake drum under the force of said first resilient means when said displaceable means is manually released;

actuator means mounted in said housing so as to be movable from a first position to a second position for engaging said brake band holding means independently of said manually displaceable means and bringing the same into said braking position;

second resilient means for resiliently biasing said actuator means into said second position;

latching means for holding said actuator means in said first position against the force of said second resilient means; and,

tripping means movable from a release-ready position to a released position for unlatching said latching means thereby causing said actuator means to move into said second position under the force of said second resilient means.

4,683,661

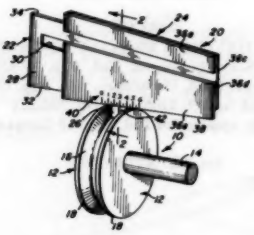
MEASURING GAUGE

Benjamin Sommer, 1004 W. Oak Glen Dr., Peoria, Ill. 61614

Filed Apr. 25, 1985, Ser. No. 727,333

Int. Cl.[4] G01B *5/18*

U.S. Cl. 33—169 B **22 Claims**



1. A gauge for measuring the width between opposing walls of a tapered groove forming the peripheral rim of a pulley, gear or the like, comprising:

a body member including a projection portion positionable in said groove into engagement with the opposing walls thereof;

a gauge member mounted on the body member for movement relative thereto in a direction oblique to said rim to bring the gauge member into abutting engagmeent with the rim; and

indicia means on said gauge member located along an edge thereof engagable with the rim and indicia means on the projection portion of said body member for determining the penetration depth of said projection portion within the groove as a function of the relative positioning between the body member and the gauge member.

4,683,662

RAPID PISTOL SIGHTING ATTACHMENTS

Zolton C. Kiss, Jr., 1257 Calle Castano, Thousand Oaks, Calif. 91360

Filed Aug. 27, 1986, Ser. No. 900,639

Int. Cl.[4] F41G *1/00, 1/10*

U.S. Cl. 33—233 **20 Claims**

1. A rapid sighting adjustable front and rear pistol sighting system comprising:

a front sight attachment including a generally U-shaped spring metal clip, means for securing said clip to the front sight of a pistol, a plurality of interchangeable sighting pins, and means for mounting a selected one of said pins on the upper portion of said clip aligned with the bore of the pistol; and

a rear sight attachment including a spring metal clip housing, and means for securing said clip housing to the rear blade sight of the pistol; and

a plurality springy rear sight inserts, each forming a generally circular sight with a sector of about 60 degrees to 140 degrees removed from the top thereof, and means for removably mounting a selected one of said sight inserts into said spring metal clip housing, with the center of the circular rear sight insert and said front sight pin being aligned parallel to the sighting and firing line of said pistol.

14. A rapid sighting adjustable front and rear pistol sighting system comprising:

a front sight attachment including a generally U-shaped spring metal clip, means for securing said clip to the front sight of a pistol, a sighting pin, and means for mounting said pin on the upper portion of said clip aligned with the bore of the pistol; and

a rear sight attachment including a rear sight support; means for securing said rear sight support to the rear blade sight of the pistol;

a sight insert forming a generally circular sight with a sector of about 60 degrees to 140 degrees removed from the top thereof, and means for removably mounting a said sight insert onto said rear sight support, with the center of the circular rear sight insert and said front sight pin being aligned parallel to the sighting and firing line of said pistol.

4,683,663

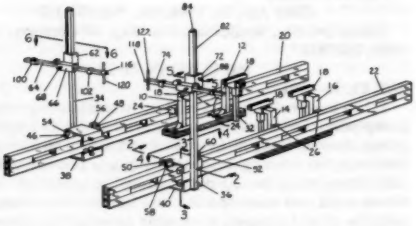
VEHICLE FRAME MEASUREMENT DEVICE

Alan J. Sarauer, 402 W. River St., Chippewa Falls, Wis. 54729

Filed May 19, 1986, Ser. No. 864,815

Int. Cl.[4] G01B *5/25*

U.S. Cl. 33—288 **4 Claims**



1. A vehicle frame and body measurement apparatus for use in realigning the structure of a damaged unibody vehicle the device having a longitudinal axis utilized in a horizontal plane,

the apparatus comprising means for measuring the vehicle body and frame comprising,

(a) means for supporting a damaged motor vehicle in a fixed position,

(b) an elongated rail on each side of said supporting means spaced apart a distance greater than the width of said supporting means and the width of said vehicle,

(c) a vertical upright of a length exceeding the height of said motor vehicle slidably supported by each of said rails and having a vertical axis substantially perpendicular to the horizontal plane of the vehicle,

(d) a vertically adjustable horizontal bar attached to each of the uprights, substantially perpendicular to both the longitudinal axis of the rails and the vertical axis of the uprights,

(e) means for affixing the horizontal bar to the uprights so that the bar is vertically adjustable, said affixing means being provided with releasable means to permit adjustable horizontal extension of said horizontal bar,

(f) at least one extendable measuring means attached to each vertical upright at its junction with its associated horizontal rail and adjustably extending along said horizontal rail, the free end of said measuring means having means to releasably affix it to said rail,

(g) at least one extendable measuring means attached to each horizontal bar at its junction with its associated vertical upright and adjustably extending along said vertical upright, the free end of said measuring means having means to releasably affix it to said upright,

(h) at least one extendable measuring means attached to each affixing means, (e), adjustably extending along said horizontal bar, the free end of said measuring means having means to releasably affix it to said horizontal bar, and

(i) a locator attached to the end of each horizontal bar.

4,683,664

APPARATUS FOR DRYING METAL TURNINGS OR SCRAP

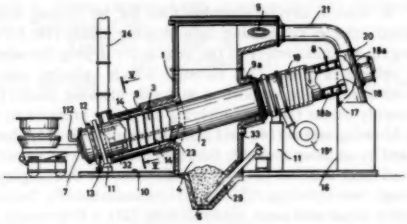
Giovanni Codenotti, Via Galli No. 7, Gussago, Brescia, Italy (25064)

Filed Nov. 13, 1984, Ser. No. 670,752

Claims priority, application Italy, Dec. 12, 1983, 5232 A/83; United Kingdom, Dec. 30, 1983, 8334622

Int. Cl.⁴ F26B *3/24*

U.S. Cl. 34—35 **6 Claims**



6. The method of drying solid waste and scrap material comprising

moving the material internally of a container having a side wall adapting to exclude from the material external atmosphere and oxygen containing gases,

applying burned vapors to the container externally thereof to heat the material coursing through the container to evaporate liquids from the material into vapors,

introducing an inert gas into the container to maintain a protective atmosphere against oxidation of the material and to absorb vapors evaporated from the material,

conducting the vapors out of said container and away from the material, and

burning the vapors conducted out of said container for application externally of the container whereby the caloric value of the liquids is utilized to produce usable heat.

4,683,665

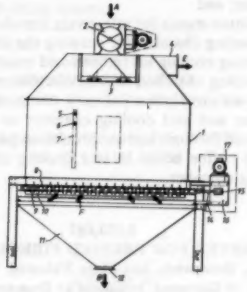
DEVICE FOR COOLING A GRANULAR PRODUCT

Pierre M. L. Geelen, 't Laar 4, 6081 CW Haelen, Netherlands

Filed Oct. 28, 1985, Ser. No. 792,381

Int. Cl.⁴ F26B *17/14*

U.S. Cl. 34—65 **7 Claims**



1. Device for cooling a granular product provided with a bunker with an intake for the material to be cooled at the top side of said bunker and a grate construction located near the bottom side of said bunker comprising a fixed grate and a movable grate movable to and fro in action, over a length of travel, and a third grate characterised in that the movable grate has been arranged under the fixed grate, whilst under the movable grate said third grate has been provided, which during operation is displaceable laterally and adjustable in several positions.

4,683,666

COFFEE ROASTER

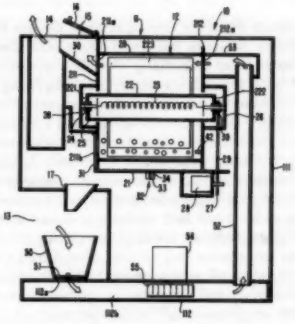
Masaru Igusa, Takasaki, and Masayoshi Nakai, Isesaki, both of Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Feb. 24, 1986, Ser. No. 832,301

Claims priority, application Japan, Feb. 23, 1985, 60-34855; Mar. 1, 1985, 60-38787

Int. Cl.⁴ E26B *11/04*

U.S. Cl. 34—67 **5 Claims**



1. A self-contained non-continuous, heat radiation rotating drum-type coffee bean roasting apparatus comprising:

a housing assembly;

a coffee bean roasting chamber disposed in said housing, said roasting chamber having coffee bean inlet means for introducing coffee beans into said roasting chamber and coffee

bean outlet means for removing coffee beans from said roasting chamber, said coffee bean inlet means being separate and distinct from said coffee bean outlet means;

rotating means for selectively rotating coffee beans within said roasting chamber;

heating means for selectively heating coffee beans within said roasting chamber;

a cooling chamber for cooling roasted coffee beans, said cooling chamber positioned within said housing assembly and below said coffee bean outlet means of said roasting chamber so that roasted coffee beans may be discharged directly from said roasting chamber into said cooling chamber; and

air circulation means for selectively circulating heated air to said roasting chamber for roasting the coffee beans or for circulating cooling air to both said roasting chamber and said cooling chamber, said air circulation means comprising an air circulation pathway connecting said roasting chamber and said cooling chamber so that cooling air circulated through said air circulation pathway cools both roasted coffee beans in said cooling chamber and said roasting chamber.

4,683,667

STEAM DRYER FOR PRESSED FIBROUS MATERIAL

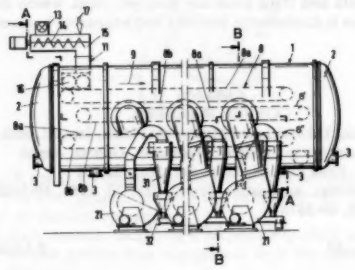
Gerd Laske, Brunswick, and Peter Valentin, Walldorf, both of Fed. Rep. of Germany, assignors to Braunschweigische Maschinenbauanstalt Aktiengesellschaft, Brunswick, Fed. Rep. of Germany

Filed Jun. 30, 1986, Ser. No. 880,165

Claims priority, application European Pat. Off., Jun. 29, 1985, 85108114.1

Int. Cl.[4] F26B *15/06*

U.S. Cl. 34—203 **12 Claims**



1. A steam dryer for drying pressed fibrous material, such as lixiviated or partially pre-dried sugar beet cossettes, wherein steam flows in an essentially closed loop circuit into intimate contact with said fibrous material, comprising a closed, pressurized substantially horizontally arranged cylindrical housing, steam supply means connected to said housing for supplying steam into said housing, steam exhaust means connected to said housing for removing steam from said housing, said steam supply means and said steam exhaust means being arranged in diametrically opposed positions on said pressurized cylindrical housing, at least one heat exchanger means arranged to extend across substantially an entire steam through-flow cross-section in a first lengthwise half of said pressurized cylindrical housing, a plurality of endless mesh belt conveyors arranged one above the other and driveable in opposite directions located in the other lengthwise half of said pressurized cylindrical housing for conveying said fibrous material and for transferring said fibrous material from an uppermost conveyor to successively lower conveyors, material feed-in means positioned above said uppermost conveyor, material output means positioned below a lowermost conveyor of said conveyors, said conveyor belts forming in said second lengthwise half of said housing several pressure chambers and exhaust chambers alternatingly arranged one above the other, whereby each of said mesh conveyor belts forms a separation plane between respective pressure and exhaust chambers, and at least one exhaust space, wherein said exhaust chambers comprise exhaust openings connecting to said exhaust space, and wherein said pressure chambers comprise inlet openings connecting said pressure chambers to said first lengthwise housing half in which said heat exchanging means is located, and wherein said exhaust space comprises several separate exhaust plenums (26) which are arranged next to one another along the length of said pressurized cylindrical housing, said dryer further comprising several blowers, whereby said exhaust plenums are each connected to the suction side of a respective blower, and wherein said first lengthwise half of said housing in which said heat exchanger is located, is connected to the pressure side of each of said blowers.

4,683,668

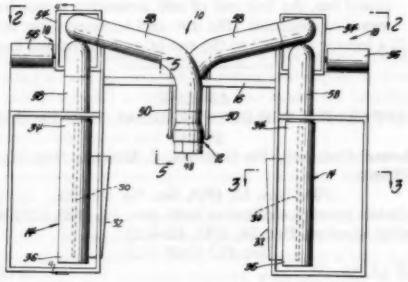
ROTATABLE SIDE BLOWER FOR AIR DRYING VEHICLES

Leonard J. Hondzinski, 53299 Aulgur Dr., Rochester, Mich. 48064, and Robert A. Wrest, 1761 Orion Rd., Lake Orion, Mich. 48035

Filed Apr. 14, 1986, Ser. No. 851,942

Int. Cl.[4] F26B *19/00*

U.S. Cl. 34—229 **45 Claims**



1. A vehicle drying assembly (10) for air drying freshly washed vehicles comprising; side blowing means (14) for discharging air transversely to the vehicle for drying the sides of the vehicle, a frame (16) through which vehicles may be moved structurally supporting said side blowing means (14), air supply means (18) for supplying air under pressure to said side blowing means (14), said side blowing means (14) characterized by an outer rotatable tube (26) rotatable with respect to a fixed inner member (22,122) for alternatively discharging air through two openings (28) spaced circumferentially from one another about said outer rotatable tube (26), a first nozzle (30, 130) extending radially from said outer rotatable tube (26) around one of said openings (28) for directing the air flow therefrom, a second nozzle (32, 132) extending radially from said outer rotatable tube around the other of said openings (28), said outer rotatable tube (26) being rotatable between a first discharge position for discharging air from said first nozzle (30, 130) transversely to the vehicle with said second nozzle (32, 132) disposed in a non-discharge position and a second discharge position for discharging air from said second nozzle (32, 132) transversely to the vehicle with said first nozzle (30, 130) disposed in a non-discharge position, and sealing means (38, 138, 238) for preventing air flow out of each of said first (30, 130) and second (32, 132) nozzles when in said non-discharge positions.

4,683,669

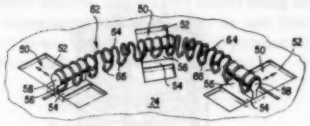
MOTOR ELEMENT FOR FACIALLY ANIMATED MANNEQUIN

Thomas J. Greer, Jr., 727 23rd St. S., Arlington, Va. 22202

Continuation-in-part of Ser. No. 487,417, Apr. 28, 1983, abandoned, which is a continuation of Ser. No. 280,367, Jul. 6, 1981, abandoned. This application Jun. 8, 1984, Ser. No. 618,728

Int. Cl.[4] G09F *19/08*

U.S. Cl. 40—414 38 Claims



1. A facially animated mannequin of the type including a substrate in the form of a head, simulated skin placed over a least a portion of the head to form a face, and motor elements intimately associated with the skin for distorting the latter so as to simulate various facial expressions, in which the motor elements comprise skin deforming members which are in contact with and fixed to the skin so as to be invisible externally thereof, and which are generally parallel to and in conformation with the contour of the skin, each motor element being capable of actuation independently of the other motor elements, the motor elements producing upon their actuation movement substantially only parallel to and in conformation with the contour of the skin, each motor element being capable of acutation independently of the other motor elements, whereby the deformation of one or more selected motor elements causes distortion and changes in the external appearance of the skin contiguous thereto, thereby simulating facial expressions, the skin and motor elements defining a first layer or stratum.

4,683,670

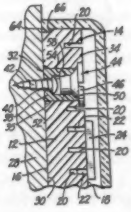
DEMOUNTABLE SIGNBOARDS

Donald L. Bates, Orange, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.

Filed Oct. 25, 1985, Ser. No. 791,454

Int. Cl.[4] G09F *7/00*

U.S. Cl. 40—620 11 Claims



1. In a signboard including a base having a front, a back and a front surface which is adapted to hold replaceable indicia the improvement which comprises:

a holding means for connecting said base with a vertical support for said base,

said holding means including a mounting member having a hollow tubular peripheral wall and a bottom which is adapted to be secured to said support through the use of a fastener,

said base including an opening located therein which extends between the front and the back of said base and which is shaped so as to fit closely around the exterior of said peripheral wall,

said holding means also including a retainer having a head which is adapted to fit against the front of said base and a shank shaped so as to fit within said peripheral wall,

said shank and the interior of said peripheral wall being shaped so as to include coacting fastening means which, when engaged, secure said board against movement relative to said holding means.

4,683,671

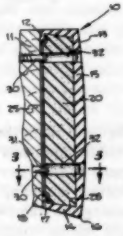
RECOIL SHOCK PAD

Frank W. Farrar, 11941 Paseo Bonita, Los Alamitos, Calif. 90720

Filed Sep. 25, 1985, Ser. No. 779,999

Int. Cl.[4] F41C *23/00*

U.S. Cl. 42—74 1 Claim



1. In combination with a gun stock having a lateral side surface and an end surface, a recoil shock absorbing cushion for attachment to the end surface only of a gun stock, said cushion comprising a jacket of flexible material having an interior pocket, a shock absorbing mass in said pocket, a perimetrical side wall surrounding said pocket, an end wall closing an outside end of said pocket, said side wall having a perimetrical rim extending around the inside end defining an opening for the pocket, a rigid plate having a perimetrical portion conforming in shape and size to the end surface of the gun stock and to the perimetrical rim, bonding means between the perimetrical portion of the plate and the perimetrical rim of the side wall, and means for anchoring the plate and accompanying jacket to the end surface only of the gun stock, said perimetrical rim comprising a laterally inwardly extending flange, said flange having one side facing the gun stock and another side, the perimetrical portion of the plate overlying said other side of said flange, said perimetrical rim of the side wall having a laterally inwardly and endwardly outwardly tilted flange forming a perimetrical recess within said side wall, said perimetrical portion of the plate having a reversely extending form receptive in said perimetrical recess and wherein during initial engagement of the perimetrical portion of the plate with said flange the remainder of the plate is at a location spaced endwardly outward from said one side of said flange and clear of the end surface of said gun stock.

4,683,672

COLLAPSIBLE GAME BLIND

Dave A. Davis, P.O. Box 185, Rockport, Tex. 78382

Filed Aug. 4, 1986, Ser. No. 892,205

Int. Cl.[4] A01M *31/00*

U.S. Cl. 43—1 11 Claims

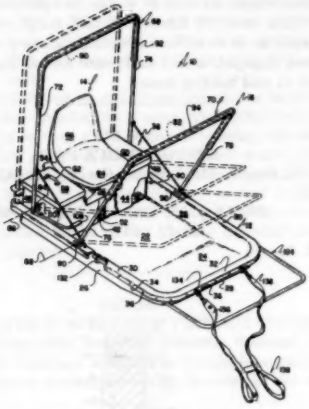
1. A game blind comprising

a base having a ground engaging generally flat bottom wall

including an upturned end and upturned sides and a seat thereon for a person;

a framework movably mounted on the base for gravitational movement from a first generally upright position to a second generally collapsed position;

camouflage material carried by the framework for disguising a person in the seat in the first position of the framework;



means for towing the base along the surface of the earth in the direction toward the upturned end including tie downs mounted on the game blind adjacent the upturned end and an elongate tow device including a harness; and

latch means for retaining the framework in the first position comprising a single release trigger adjacent the seat and operable by the person when seated therein.

4,683,673

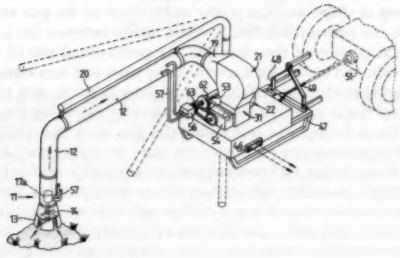
APPARATUS FOR DESTROYING FIRE ANTS

Adoyal Taylor, Rte. 2, Box 113, Fulton, Miss. 38843

Filed Jul. 8, 1986, Ser. No. 883,322

Int. Cl.[4] A01M *1/06*

U.S. Cl. 43—139 **9 Claims**



1. Apparatus for eradicating mounding fire ants in situ comprising:

(a) means for confining a substantial portion of a fire ant mound for removal thereof;

(b) means for applying sub-atmospheric pressure to said means for confining such that a portion of said mound and the contents thereof is entrained as debris in an enclosed airflow toward said means for applying sub-atmospheric pressure;

(c) means cooperatively positioned between said means for confining and said means for applying for substantially separating said debris from said airflow;

(d) means for pulverizing said debris after said debris is separated from said airflow; and

(e) means positioned within said means for confining for disrupting said mound and the adjacent soil.

4,683,674

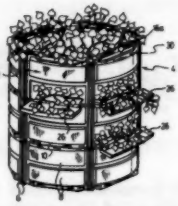
COMPOST BIN

Thomas L. Faul, Washago, Canada, assignor to Barclay Horticulture Mfg. Ltd., Downsview, Canada

Filed Nov. 15, 1985, Ser. No. 798,281

Int. Cl.[4] A01G *9/02;* **E04G** *11/04*

U.S. Cl. 47—83 **21 Claims**



11. A garden planter, receptacle or the like structure suitable for composting or as a vertical planter comprising a plurality of connected like molded plastic panels which form the sidewalls of the structure, each panel being generally rectangular in elevation and a portion thereof intermediate edges of said panel being horizontally curved and displaced outwardly, each panel including separate horizontal and vertical edge connecting regions hinged out of the plane of said panel and extending into the structure, horizontally adjacent panels being connected by paired overlapping vertical edge regions between said panels with said panels held in abutting contact by securing means associated with said edge regions, said edge regions reinforcing said molded panel by providing horizontal and vertical stiffening struts.

4,683,675

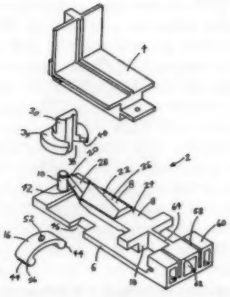
SHOE FOR A CLOSURE

Volker Guelck, Waterloo, Canada, assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Nov. 7, 1985, Ser. No. 795,891

Int. Cl.[4] E05D *15/22*

U.S. Cl. 49—181 **20 Claims**



1. A shoe for use with a sash of a closure, said sash having means thereon for engaging said shoe and being mounted in a frame, said shoe comprising a base with first and second engagement means located thereon, said sash having third and fourth engagement means located thereon, said third and

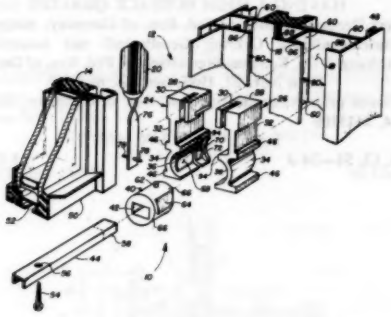
fourth engagement means corresponding to said first and second engagement means respectively, said second and fourth engagement means together providing pivoting means so that said sash can be rotated relative to said frame about said second and fourth engagement means, said sash and said shoe being slidable relative to said frame when said sash is parallel to said frame and said shoe is mounted between said sash and said frame with said first engagement means properly engaged with said third engagement means and said second engagement means properly engaged with said fourth engagement means, said shoe thereby being engaged at two locations along the length of said sash, said first and third engagement means being designed to disengage when said sash is rotated to a non-parallel position relative to said frame, said base having braking means located thereon, said braking means being activated, by said first engagement means, as soon as said first and third engagement means begin to disengage to prevent said shoe and said sash from sliding relative to said frame.

4,683,676

TILT WINDOW BALANCE SHOE ASSEMBLY

Maurice E. Sterner, Jr., Spring Grove, Pa., assignor to Product Design & Development, Inc., York, Pa.

Filed Nov. 20, 1985, Ser. No. 799,826
Int. Cl.[4] E05D *15/22*
U.S. Cl. 49—181 **10 Claims**



1. A tilt window balance shoe assembly, including:

a split balance shoe structure comprises of a first balance shoe half and a second balance shoe half adapted for mechanically cooperative insertable assembly within a window casing jamb channel,

a barrel cam,

first and second semicircular faces provided respectively in said first and second balance shoe halves adapted upon insertable window casing jamb channel assembly thereof to form a flexure sleeve opening with an elongated slot to insertably receive a barrel cam provided with a flexure sleeve opening retention lug protrusion and for rotatably retained receivable support thereof including a retention lug assembly and guide slot to retain said retention lug protrusion upon rotational deflection of said barrel cam, and

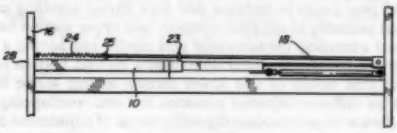
a pivot bar means cooperatively communicating with said barrel cam interconnectably with the lower frame member of a tilt window sash and operable therewith to translate pivotal sash displacement therethrough for effecting rotation of said barrel cam within said flexure sleeve opening and thereby move said first and second balance shoe halves and cause a friction contact locking or release of said balance show assembly within said window casing jamb channel.

4,683,677

POWER BEAM FOR ROTATING STRUCTURAL MEMBER

Bruce A. Jurgensen, 3412 - 17th Ave., Forest Grove, Oreg. 97116

Continuation-in-part of Ser. No. 739,555, May 30, 1985, abandoned. This application Feb. 10, 1986, Ser. No. 828,096
Int. Cl.[4] E05F *11/00*
U.S. Cl. 49—200 **11 Claims**



1. A power beam for rotating a structural member about a hinged connection to a frame, comprising:

a channel member positioned adjacent said structural member and adjacent said hinged connection of said structural member to said frame;

a slideable beam within said channel member, said beam being disposed to slide within said channel member;

means for driving said slideable beam within said channel member in linear reciprocating movement;

cable means attached at one end to said structural member at a set distance from said hinged connection, said cable means contacting the end of said slideable beam which is nearest said attachment of said cable means to said structural member;

bias means attached between the other end of said cable means and said frame; and

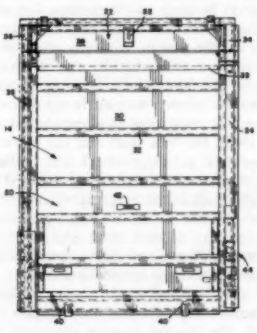
a stop member positioned adjacent said cable and adjacent said bias means whereby as said slideable beam experiences movement by said means for driving said slideable beam, said cable moves along with said slideable beam at its contact with said end of said beam and said cable draws against said bias means until said bias means reaches a limit at said stop member whereupon appreciable torque is applied by said cable to said structural member.

4,683,678

ADJUSTABLE RAILWAY BOXCAR DOOR

Ralph E. Cummings, Omaha, Nebr., and Denis R. Brzezinski, Richton Park, Ill., assignors to Railcar Specialties, Inc., Alsip, Ill.

Filed Apr. 17, 1986, Ser. No. 853,191
Int. Cl.[4] E05D *15/06*
U.S. Cl. 49—426 **9 Claims**



1. An adjustable railway boxcar door comprising a bottom

section and an upper section with said bottom section having support means adjacent a lower edge for support on a rail, and an upper edge, post means defining front and rear edges for said bottom section with sheet means extending between said post means, said upper section having additional post means along front and rear edges aligned with said post means on said bottom section, said upper section having extensions extending from lower ends of said post means and received into said post means of said bottom section, said post means being channel-shaped in cross-section and said extensions having a corresponding channel shape with said extensions being welded to said post means to stabilize said door during handling prior to final assembly in adjusted position, said upper section having a sheet extending between said post means and having a lower portion overlapping said sheet means on said bottom section, said post means of said lower section having scribe lines to define different adjusted positions and said overlapping being sufficient to accomodate the entire range of adjustment defined by said scribe lines, and fastener means maintaining said sections in adjusted positions.

4,683,679

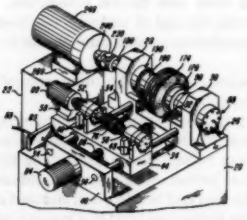
GRINDING AND DRESSING WHEEL SUPPORT AND RELEASE APPARATUS

Stuart C. Salmon, P.O. Box 40469, Cincinnati, Ohio 45240

Filed Jan. 6, 1986, Ser. No. 816,411

Int. Cl.[4] B24B *45/00, 53/04*

U.S. Cl. 51—5 D **8 Claims**



1. Grinding apparatus for continuous dressing of a grinding wheel comprising: first support structure, a first bearing housing, the first bearing housing being supported by the first support structure, the first bearing housing including hydrostatic bearing means, a second bearing housing supported by the first support structure, the second bearing housing including hydrostatic bearing means, a first shaft, the first shaft being rotatably supported by the hydrostatic bearing means of the first bearing housing, a second shaft, the second shaft being rotatably supported by the hydrostatic bearing means of the second bearing housing, a piston integrally attached to the second shaft for rotation with the second shaft, the piston having a given axial length, a piston housing encompassing the piston, the piston housing having an internal length significantly greater than the axial length of the piston whereby axial movement of the piston is permitted and whereby the second shaft is axially movable upon the hydrostatic bearing means, fluid conduit means within the second bearing housing for introduction of fluid thereinto for reciprocal axial movement of the piston and the second shaft, the first shaft and the second shaft being in axial alignment, a grinding wheel unit including a grinding wheel, the grinding wheel unit being engaged by the first shaft and the second shaft as the grinding wheel unit is supported by the first shaft and the second shaft and positioned between the first shaft and the second shaft and rotatable wherewith, whereby the grinding wheel unit is removable from the first shaft and the second shaft by axial movement of the piston and the seoond shaft with fluid forces upon the piston, second support structure adjacent the first support structure, a first dresser shaft, the second support structure including means rotatably supporting the first dresser shaft, the second support structure including hydrostatic bearing means rotatably supporting the second dresser shaft in axial alignment with the first dresser shaft, a dressing wheel unit including a dressing wheel, the dressing wheel unit being in engagement with the first dresser shaft and the second dresser shaft and being positioned between the first dresser shaft and the second dresser shaft and supported thereby, a dresser shaft piston integrally attached to the second dresser shaft and rotatable therewith, the dresser shaft piston having a given axial length, a dresser shaft piston housing encompassing the dresser shaft piston, the dresser shaft piston housing having an internal length which is significantly greater than the axial length of the dresser shaft piston whereby axial movement of the dresser shaft piston and the second shaft is permitted, fluid conduit means within the dresser shaft piston housing for introduction of fluid thereinto for reciprocal axial movement of the dresser shaft piston, whereby the second dresser shaft is axially movable upon the hydrostatic bearing means toward and away from the first dresser shaft for removal of the dressing roll unit from a position between the first dresser shaft and the second dresser shaft and for securing the dressing roll unit between the first dresser shaft and the second dresser shaft, and means for controlled movement of the second support structure toward and away from the first support structure, whereby the dressing wheel is maintained in constant engagement with the grinding wheel during a grinding operation.

4,683,680

METHOD AND APPARATUS FOR PRODUCING BORES HAVING A HIGH SURFACE QUALITY

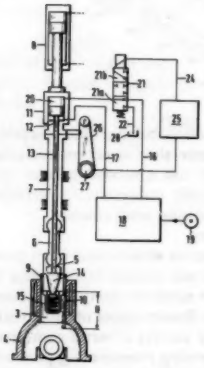
Albert Bender, Ostfildern, Fed. Rep. of Germany, assignor to Maschinenfabrik Gehring Gesellschaft mit beschränkter Haftung & Co. Kommanditgesellschaft, Fed. Rep. of Germany

Filed Nov. 27, 1985, Ser. No. 802,857

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1984, 3443106

Int. Cl.[4] B24B *7/00, 9/00*

U.S. Cl. 51—34 J **15 Claims**



1. A method of producing, in workpieces, round bores having a high surface quality; said method comprising the steps of:

carrying out at least fine surface machining with a rotating honing tool that executes a reciprocated stroke movement in the direction of the axis of a given bore, and that has honing stones which can be pressed radially aganist the wall of said bore via a feed system; and

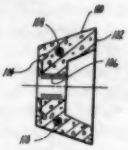
reducing the force, with which said honing stones are pressed against said bore wall, during reversals of the direction of said stroke movement of said honing tool to preclude damaging upon effects said roundness of the bores in a critical region of reversal of stroke movement.

4,683,681

GRINDING WHEEL WITH BALANCING RING

Peter J. Russ, III, 12933 W. Eight Mile Rd., Detroit, Mich. 48235

Filed Aug. 12, 1986, Ser. No. 895,695
Int. Cl.[4] B24B *41/04*; F16F *15/22*
U.S. Cl. 51—169 7 Claims



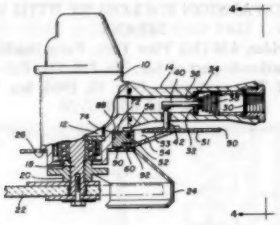
1. A combination comprising:
a grinding wheel adapted to be rotated about an axis, the grinding wheel including a mass of abrasive material;
a hollow balance ring embedded in the grinding wheel material, the balance ring being formed about a central axis coinciding with the axis of rotation of the grinding wheel, the balance ring having an endless, internal annular channel; and
a plurality of steel shot, partially filling the annular channel so as to move to a position to dampen any dynamic imbalance in the grinding wheel as it is being rotated about the axis of rotation.

4,683,682

SAFETY LEVER FOR PORTABLE POWER TOOL

Robert A. Pennison, Bellville, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sep. 19, 1986, Ser. No. 910,114
Int. Cl.[4] B24B *55/04*
U.S. Cl. 51—170 R 10 Claims



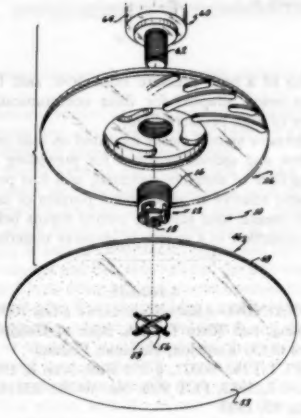
1. A safety improved control lever and guard for an air pressure powered hand held tool, comprising:
(a) a tool housing having a handle;
(b) an air pressure driven motor mounted in said housing and operably connected to an output spindle extending from said housing;
(c) a work engaging means mounted on said spindle and a work means mounted on said work engaging means;
(d) a guard means mounted on said housing and at least partially surrounding said work means;
(e) an air pressure flow control valve means mounted in said handle and having a valve actuator member extending transversely from said handle operable to control the flow of air from a source of driving air into said motor;
(f) a valve actuating lever contacting said valve actuator member and operable upon movement by hand motion of an operator to displace said valve actuator member to open said control valve means to pass air therethrough and cause operation of said motor; and
(g) a lever mount means pivotally mounting said valve actuating lever to said housing, said lever mount means being removably mounted with said housing and secured in place on said housing by a portion of said guard means such that removal of said guard means releases said lever mount means from its mounted position thereby disabling said valve actuating lever from operable contact with said valve actuator member.

4,683,683

ABRASIVE MATERIAL MOUNTING STRUCTURE

Aleck Block, 800 Warner Ave., Los Angeles, Calif. 90024

Filed Aug. 19, 1985, Ser. No. 767,352
Int. Cl.[4] B24D *13/14*, *13/20*
U.S. Cl. 51—377 49 Claims



1. An abrasive disc for retention by detaining means and for application against a workpiece, including,
means including a backing member having first and second opposite faces,
there being particles on the first face of the means including the backing member for application against the workpiece,
at least one staple attached to the means including the backing member,
the staple including a body portion and opposite ends extending from the body portion with the body portion extending along a particular one of the first and second faces of the means including the backing member and with the opposite ends extending through the other one of the first and second faces of the means including the backing backing member and being bent toward the other one of the first and second faces for detention of the staple on the means including the backing member and for coupling of the staple to the detaining means, the body portion and the opposite ends of the staple defining substantially a common plane.

4,683,684

HIGH PRESSURE FLUID JET APPARATUS FOR CUTTING AND REMOVING PAVEMENT

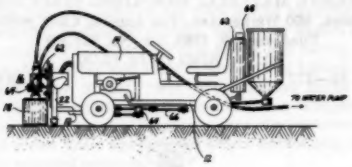
Gene G. Yie, Auburn, Wash., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Oct. 22, 1985, Ser. No. 790,052
Int. Cl.[4] B24C *3/06*
U.S. Cl. 51—429 1 Claim

1. High pressure fluid apparatus for cutting pavement and other high strength materials comprising:
(a) a mobile framework adapted for movement in a horizontal direction;

(b) a mobile carriage and carriage means for moving said mobile carriage in a direction transverse to said horizontal direction, said carriage means being disposed in said mobile framework;

(c) fluid swivel means mounted on said carriage having first and second portions, means for providing rotation of said first portion of said fluid swivel means relative to said second portion of said fluid swivel means without interruption of a high pressure fluid flow, said fluid swivel means being adapted for fluid communication with a source of high pressure fluid;



(d) an abrasive swivel means mounted on said carriage having first and second portions for providing a noninterrupted flow of abrasive materials, said first portion being rotatable relative to said second portion of said abrasive swivel means; said abrasive swivel means being adapted for connection to a source of abrasive material.

4,683,685

DRAINING ARRANGEMENT FOR ROOF

Olavi Ebeling, and Risto Lunden, both of Helsinki, Finland, assignors to Oy Kontekla, Helsinki, Finland

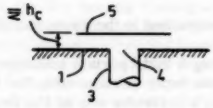
PCT No. PCT/FI83/00021, § 371 Date Nov. 3, 1983, § 102(e) Date Nov. 3, 1983, PCT Pub. No. WO83/03114, PCT Pub. Date Sep. 15, 1983

Continuation of Ser. No. 552,031, Nov. 3, 1983, abandoned. This PCT application Mar. 7, 1983, Ser. No. 877,713

Claims priority, application Finland, Mar. 9, 1982, 820807; Mar. 11, 1982, 820846; Jan. 24, 1983, 830227

Int. Cl.[4] E04D *13/00*; E02B *5/08*

U.S. Cl. 52—12 **9 Claims**



1. Apparatus for the draining of water from a roof having an overall flat upper surface lying in a roof plane comprising:

a water discharge opening having a periphery, the periphery lying in said roof plane;

a generally vertical drain conduit extending downwardly from said discharge opening, said drain conduit having a cross section corresponding to the cross section of said discharge opening and being capable of carrying rain water at a prdetermined flow rate; and

a flow control disc having a peripheral edge, said disc being positioned directly above said discharge opening, said disc being spaced above the roof plane approximately ¼ of a height corresponding to said predetermined flow rate and being larger than said discharge opening, the height of said disc and its horizontal dimensions being such that the length of the edge of the disc and the height of the disc spaced above the roof plane correspond to the quantity of water that flows at said predetermined flow rate at the discharge opening;

whereby in the space underneath the disc the water flow is converted to closed flow continuously.

4,683,686

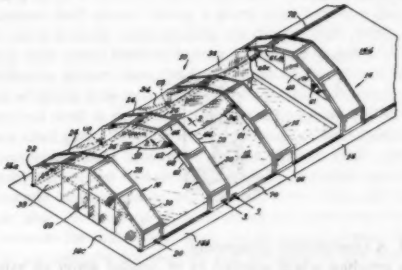
SWIMMING POOL COVER

Veli Ozdemir, 5074 W. 85th La., Crown Point, Ind. 46307

Filed Mar. 11, 1985, Ser. No. 710,107

Int. Cl.[4] E04B *1/343, 7/16*

U.S. Cl. 52—64 **15 Claims**



1. A removable enclosure cover for a swimming area or the like; said enclosure cover including a plurality of frame members, each frame member comprising a plurality of rectangular sections connected in end-to-end relataionship with each rectangular section including a panel of rigid material, panels of a flexible material extending between adjacent frame members, a single pair of spaced parallel, track members on opposite sides of the area being covered, roller guide means attached to each of said frame members and each such roller guide means extending into rolling engagement with a respective one of said single pair of track members; whereby said frame members carrying said rigid panels may be guided along said track members toward and away from one another to selectively and respectively collapse and expand said panels of flexible material to cover and uncover at least a portion of the area between said track members.

4,683,687

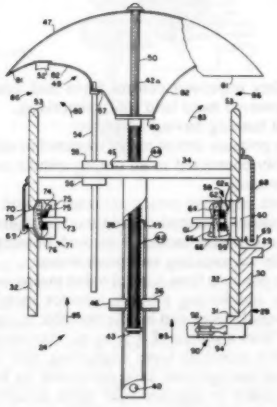
VIEW EXPANSION ENCLOSURE WITH VENTING MEANS

Brian D. Crider, 426 Oak View Terr., Palm Harbor, Fla. 33563

Continuation-in-part of Ser. No. 828,031, Feb. 10, 1986, abandoned. This application Nov. 10, 1986, Ser. No. 929,102

Int. Cl.[4] E04B *7/16*

U.S. Cl. 52—72 **19 Claims**



1. A structure of the type which enables its occupants to

have a substantially unrestricted view of the environment surrounding the structure and which allows its occupants to control the flow of air currents therethrough, comprising:

a multifaceted lower portion defined by a plurality of flat, upstanding, transparent rectangular sidewalls;

a multifaceted upper portion having flat, transparent, inclined topwalls, said inclined topwalls collectively having the appearance of an inverted funnel and being positioned so as to converge toward an apex of the structure;

a circular opening formed in said structure at its apex, each of said converging topwalls having an arcuate cut out portion formed in its uppermost end so that said circular opening is collectively defined by said cut out portions;

an upstanding tubular sleeve member positioned in registration with said opening so that air within said structure can exit therefrom through said sleeve member;

an adjustably mounted, hemispherical in configuration cap member associated with said sleeve member;

an occupant-operated opening and closing means for raising and lowering said cap member with respect to said sleeve member so that air currents cannot flow out of said structure through said sleeve member when said cap member is in its lowered position;

and said cap member having a bottom with a centrally disposed, flat, circular base means and wherein concave sidewalls are mounted about the periphery of said base means and extend unpwardly and outwardly therefrom to promote air flow through said sleeve member with a minimum amount of turbulence.

4,683,688

CONTAINERIZED SHOOTING RANGE

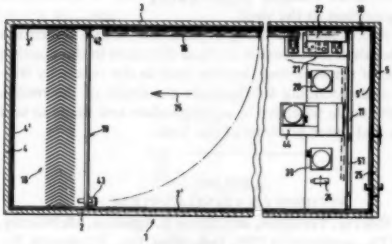
Allan S. Wojcinski, Bonifatiustrasse 88, D-4000 Düsseldorf 11, Fed. Rep. of Germany

Filed Mar. 18, 1985, Ser. No. 712,802

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1984, 3409768

Int. Cl.[4] E04C *2/32;* **E04H** *14/00;* **F41J** *1/18*

U.S. Cl. 52—79.1 **23 Claims**



1. A shooting range assembly, comprising a transportable container having a pair of side walls, a front wall, a rear wall, a bottom wall and a top wall, said walls cooperating to define a shooting range internally of said container and including a door for gaining access to said shooting range, each of said walls being designed to resist penetration by projectiles and to inhibit rebounding of projectiles therefrom, and at least one of said walls comprising a pair of rubber layers, and a steel layer sandwiched between said rubber layers and bonded to at least one of the latter; target means carried by said container; and ventilating means for ventilating said shooting range mounted on said container.

4,683,689

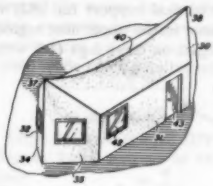
MODULAR REINFORCED BUILDING STRUCTURE AND METHOD

Albert D. Loggy, Portoviejo 442 Y Versalles, Quito, Ecuador

Division of Ser. No. 752,033, Jul. 5, 1985, Pat. No. 4,597,925. This application May 20, 1986, Ser. No. 864,874

Int. Cl.[4] E04B *1/32*

U.S. Cl. 52—80 **3 Claims**



1. A reinforced concrete building module, including in combination:

first and second spaced-apart elongated vertical sidewalls each having first and second vertical edges of a predetermined height on opposite ends thereof;

third and fourth vertical end walls each having first and second edges on opposite ends thereof with the second edges thereof extending upwardly a greater distance than the first edges thereof, with the first edge of said third end wall being of said predetermined height and connected to the first edge of said first sidewall and the first edge of said fourth end wall being of said predetermined height and connected to the first edge of said second sidewall, with the second edges of said third and fourth end walls being connected together at a line beyond the space between said first and second sidewalls;

fifth and sixth vertical end walls, each having first and second vertical edges, with the second edges thereof extending upwardly a greater distance than the first edges thereof, with the first edge of said fifth end wall being of said predetermined height and connected to the second edge of said first sidewall and the first edge of said sixth end wall being of said predetermined height and connected to the second edge of said second sidewall, with the second edges of said first and sixth end walls connected together at a line located beyond the space between said first and second sidewalls;

roof means, having a curved shape in all cross-sections thereof, covering the space enclosed by said first, second, third, fourth, fifth and sixth walls, with said roof means having substantially concave cross-sections in planes parallel to said first and second sidewalls; and

wherein said first and second sidewalls are parallel to one another, said third and fifth end walls are parallel to one another, and said fourth and sixth ends walls are parallel to one another to cause said building module to be in a generally boat-shaped configuration and wherein all of said walls and said roof means are constructed of reinforced concrete.

4,683,690

SUPPORT DEVICE AND WALL FOR A CABLE DUCT IN A CAVITY LINING FLOOR

Carl Röllin, and Hanspeter Rüfenacht, both of Hausen, Switzerland, assignors to BTA Boden-Technik AG, Zurich, Switzerland

Filed Sep. 22, 1986, Ser. No. 909,679

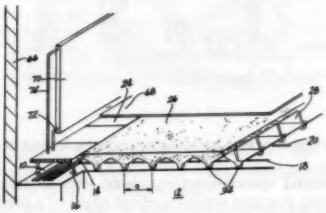
Claims priority, application Switzerland, Aug. 9, 1986, 3217/86

Int. Cl.[4] E04B *5/48*

U.S. Cl. 52—126.2 **10 Claims**

1. A support device and wall for a cable duct (10) in a cavity lining floor, which device comprises a lift-off double bottom

(24) in the direction of the cable duct (10) and a prefabricated blind shuttering (28) on the opposite side and exhibits legs (16) standing on the bare concrete floor (12) at regular intervals corresponding to an integral multiple of the interval (e) of adjacent depressions (34) in the blind shuttering (28), which legs are in alignment with the depressions (34) relative to the transverse direction of the cable duct (10), wherein the support device and wall comprises legs (16) constructed as support plates (54) with vertical support rod (52) which exhibits a screwthread at least in the uppermost region, and a support profile (14) arranged on these legs (16) with a cantilevered



profile tab (32, 36) on each side as a horizontal bearing surface for the edge (30) of the blind shuttering (28) or the double bottom (24) respectively, a profile tab (32) projecting vertically upwards and separating the double bottom (24) and the cast-in mass (26), and a groove (48) of square or rectangular cross-section open downwards having longitudinal groovings (50) recessed continuously in both lateral faces, which groovings correspond to the screwthread of the support rods (52) and are mutually vertically staggered by half the pitch of the screwthread, whilst the screwthread of the support rods (52) is engaged in the longitudinal groovings (50) of the groove (48).

4,683,691

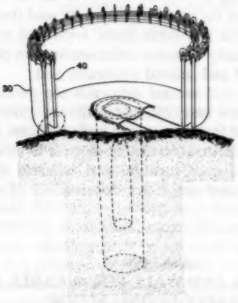
PROTECTIVE ANNULAR CONSTRUCTION AND METHOD OF MANUFACTURE

Paul Malzahn, 1328 Jay St., New Orleans, La. 70122

Filed Feb. 24, 1986, Ser. No. 832,372

Int. Cl.[4] E04H *9/04, 9/12*

U.S. Cl. 52—167 **18 Claims**



1. A method of constructing a protective device about a facility which method comprises:

(a) forming two vertically upstanding substantially concentric cylinders of concrete upon the surface of the soil, surrounding a facility to be protected, wherein each of said concrete cylinders is formed with a foot portion and each foot portion is provided with a cutting shoe; and

(b) excavating the soil beneath and between said cylinders to permit said cylinders to descend into the soil.

4,683,692

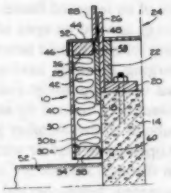
INSULATION STRIP

Allen Tetschner, 622 E. Loucks St., Sheridan, Wyo. 82801

Filed May 3, 1985, Ser. No. 730,104

Int. Cl.[4] E04B *1/78*

U.S. Cl. 52—169.11 **4 Claims**



1. An insulation strip adapted for application to the surface of a wall having elements extending outwardly from the surface thereof different amounts, thereby forming inner and outer portions considered perpendicular to the wall, the insulation strip when so applied having a position of use on the wall, the insulation strip comprising,

a shell having a recess and an open side, and in its said position of use having its open side directed to the wall, the shell including,

(a) an outer imperforate member of a width substantially determining a vertical dimension of the strip as oriented in its position of use, and having upper and lower side edges and being of indeterminate length,

(b) side elements on an inner surface of the outer member extending along the side edges determining a depth dimension of the recess and thereby the thickness of the strip perpendicular to the wall, wherein,

the side elements have substantial dimension in the direction perpendicular to the wall,

the side elements are identified as upper and lower side elements corresponding to the respective side edges, and

the upper side element having an inner edge engaging the wall that is so inclined that when that side element is forced into tight engagement with the surface of the building in securing the insulation strip to the building, the lower portion of the shell is biased inwardly into engagement with the building,

(c) insulation material in the recess, free of mechanical connection to the shell,

the insulation material being expandable, with a dimension greater than the recess in vertical direction in the position of use of the strip and thereby held in the recess by friction, and extending substantially the depth of the recess, and yieldable whereby to accommodate and shape to said inner and outer portions of the wall.

4,683,693

SLOPED GLAZING SYSTEM

James A. Rockar, Tarentum, and James E. Ignatius, McMurray, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 9, 1985, Ser. No. 806,584

Int. Cl.[4] E04B *7/00*

U.S. Cl. 52—198 **21 Claims**

1. A sloped glazing system for a building or the like, comprising:

a plurality of purlins;

a plurality of rafters;

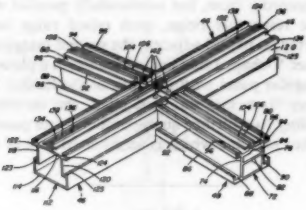
means for interconnecting said rafters and purlins to form a grid having a plurality of glazing openings;

means for mounting said grid to structure of the building;

a glazing panel mounted in selected ones of said plurality of glazing openings, each said panel having an inner major surface facing towards interior of the building and an opposite outer major surface;

hanger means mounted to inner surface of said each panel adjacent to each side edge thereof, said hanger means comprising a generally channel-shaped member with adjacent channel-shaped members of adjacent panels having an opening facing each other;

means engaging said hanger means for securing said panels within its respective glazing opening, said securing means comprising means for engaging hanger means at each side of said panel and adjacent hanger means of adjacent panels to secure said hanger means of said panel and said adjacent panels to each other and to said grid;



setting block supporting means extending between adjacent horizontal edges of said adjacent panels as mounted, said setting block supporting means being slidingly interengaged with said securing means;

setting block means interposed between said setting block supporting means and adjacent lower horizontal edge of said adjacent panel for vertically supporting said panel; and

means for sealing spaces between adjacent peripheral edge portions of said adjacent panels.

4,683,694

HOLDING ARRANGEMENT FOR A PANE SUCH AS A WINDSHIELD

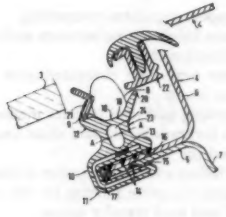
Hermann Ziegler, Renningen, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 22, 1985, Ser. No. 757,468

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1984, 3426995

Int. Cl.[4] E06B *3/00*

U.S. Cl. 52—208 **8 Claims**



1. A holding arrangement for supporting a pane, such as a windshield for a motor vehicle, at a flange means of a supporting frame, comprising:

an adhesive element supportingly engageable with a surface of the pane; and

an elastomer profile having a first portion of a U-shaped form including a reinforcing insert for fitting onto the flange means and a second portion for holding the pane on one side at a distance from the frame, said second portion including first and second lip means supportingly arranged at said one side of the pane, said second portion have a decreasing cross-section in a direction form the first and second lip means towards the flange means, said first and second lip means delimiting a recess for receiving the adhesive element;

further comprising a bordering arrange at an edge portion of the pane;

wherein said first lip means faces said edge of said pane and extends toward said bordering of said edge,

wherein said second lip means has a fold-type shape for accommodating assembly tolerances, and wherein said second lip means faces away from said edge and rests against said pane while being prestressed.

4,683,695

CHANNELLED BASE MEMBER FOR DIVIDER PANELS

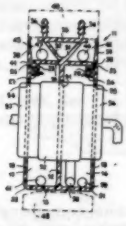
Massimo Galli, Massa, Italy, assignor to Olivetti Synthesis, S.p.A., Ivrea, Italy

Filed Sep. 2, 1986, Ser. No. 902,587

Claims priority, application Italy, Sep. 18, 1985, 67790 A/85

Int. Cl.[4] E04F *19/04*; E04B *2/74*

U.S. Cl. 52—221 **6 Claims**



1. A channelled base member for divider pannels comprising a load-bearing support provided with a supply passage for electrical cables for supplying items of electrical equipment which are disposed adjacent to the divider panels, wherein the load-bearing support is integral with at least one cover element which completes the supply passage and is movable from a first position in which the cover causes access to the passage to a second position in which the cover completely covers the passage, and wherein the base member is of plastics material produced in one piece and comprises a first substantially rigid portion for performing a support function and a second flexible portion defining a hinge for causing the cover element to take up the first and second positions, further comprising,

a second supply passage defined by the load-bearing support and disposed on the opposite side with respect to the first passage;

a second cover element which is substantially identical to the first cover element integral with the support through another hinge and movable between first and second positions respectively for access to and for closing of the second passage; and

resilient means on the cover element which cooperate with latch means on the load-bearing support when the cover element is in the second position;

wherein the load-bearing support is of a cross section of substantially a double T-shaped configuration comprising, in use, a substantially vertical wall portion and two horizontal flanges in which a first flange has a support function and is connected to the one and the other hinge for the first and the second cover elements;

wherein the second flange comprises latching means for the two cover elements and two further hinges connected to two side strip portions which are in the same plane as the first and second cover elements when these elements are in their second positions; and

wherein said second flange is integral with two ribs disposed in an inclined position and having a horizontal portion from which project strip portions bearing sawtooth con-

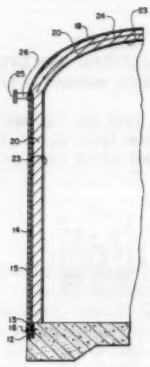
figurations, which are capable of supporting a divider panel.

4,683,696

INSULATED BUILDING STRUCTURE

Theodore T. Thoeny, 1054 Haviland Terr., Seaside, Calif. 93955

Division of Ser. No. 523,887, Aug. 17, 1983, Pat. No. 4,550,544.
This application May 23, 1985, Ser. No. 737,091
Int. Cl.[4] E04B *1/32*
U.S. Cl. 52—247 6 Claims



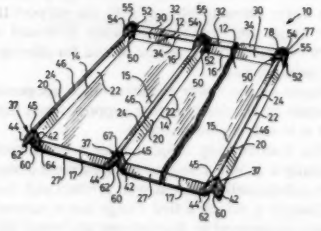
1. A building structure, comprising a foundation having a stepped portion, respective inner and outer upstanding panels forming a contiguous wall and having respective upper and lower portions, the lower portion of the respective panels being nested within the stepped portion of the foundation and secured thereto, the inner and outer panels overlapping one another so that the adjacent vertical edges of said inner panels underlie a respective outer panel, a membrane carried by the upper portion of the respective panels, and foam insulation applied to at least one of the interior and exterior surfaces of the membrane and panels.

4,683,697

ROOFING TILES

Arthur H. Gregg, RR #3, Orillia, Ontario, Canada (L3V 6H3)

Filed Feb. 11, 1986, Ser. No. 828,369
Int. Cl.[4] E04D *3/30, 3/365*
U.S. Cl. 52—520 5 Claims



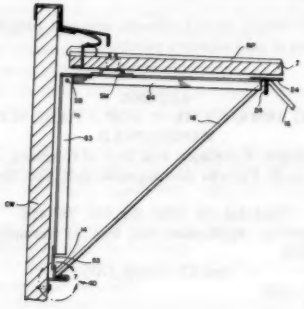
1. A roofing tile comprising a sheet of malleable material formed so as to define at least one flat rectangular panel having two side edges and two end edges, a raised ridge along each side edge, at least some of said raised ridges being substantially an inverted "V" in section taken perpendicular to the respective side edge, thus defining two flanks, an outwardly and downwardly sloping first marginal panel connected to one end edge, an outwardly and upwardly sloping second marginal panel connected to the other end edge, the second marginal panel having an outer edge, a third marginal panel substantially parallel with said flat rectangular panel and connected to said outer edge of the second marginal panel, each raised ridge being downwardly inverted, at its end adjacent the first marginal panel, along a V-shaped fold line which lies in a plane oblique to the rectangular panel with the apex of the fold line directed toward the said other end edge, the inverted ridge flanks providing two quasi-parallelogram panels meeting at a join line which is an inverted part of the apex of the ridge, two substantially triangular panels connected to each pair of quasi-parallelogram panels, the triangular panels being in planes spaced downwardly from, but substantially parallel with, the flanks of the respective ridge, each raised ridge being upwardly inverted, at its end adjacent the second marginal panel, along a further V-shaped fold line which lies in a plane oblique to the rectangular panel with the apex of the further fold line directed away from said one end edge, the inverted ridge flanks providing two further quasi-parallelogram panels meeting at a further join line which is an inverted part of the apex of the ridge.

4,683,698

LOAD TRANSFER CLIP FOR ROOF PANEL SUPPORT TRUSSES

James E. Churchman, Roeland Park, Kans., assignor to Butler Manufacturing Company, Kansas City, Mo.

Filed Jul. 11, 1986, Ser. No. 884,352
Int. Cl.[4] E04H *12/10;* E04B *5/10*
U.S. Cl. 52—655 14 Claims



1. A roof panel support apparatus comprising:
elongated joist means for mounting between walls of a building during construction thereof;
load transfer means with said elongated joist means for transferring shear loads;
clip means for attaching said load transfer means to at least one of said walls for transferring said shear loads between th joist means and the wall; and
said clip means including a formed member of sheet material having a U-shaped reception portion on one end thereof for reception of said load transfer means.

4,683,699

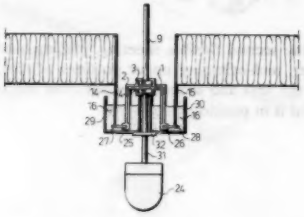
SUSPENDED CEILING STRUCTURE FOR RECTANGULAR FILTER ELEMENTS

Bertil Larsson, Tyresö , Sweden, assignor to Fläkt Aktiebolag, Nacka, Sweden

Filed Dec. 10, 1985, Ser. No. 806,813
Claims priority, application Sweden, Jan. 29, 1985, 8500398
Int. Cl.[4] E04B *5/57, 5/55*
U.S. Cl. 52—775 1 Claim

1. A suspended ceiling structure for rectangular filter elements having skirts depending from the edges of the filter

elements, said structure comprising a framework suspended by tie rods and comprising outer and inner U-shaped channels, an internal surface of the outer channel slidingly receiving an external surface of the inner channel, each of said channels comprising a web portion and shank portions extending therefrom, the web portion of each channel being provided with a longitudinal groove disposed such that the grooves of the inner and outer channels, respectively, face away from each other when the channels are fitted together, the groove of the outer channel facing upwardly and comprising attachment means attaching the framework to the tie rods, and the groove of the



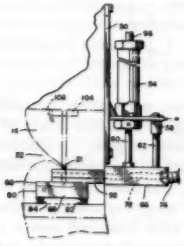
inner channel facing downwardly, wherein ends of said shank portions of said outer channel comprise inwardly extending members retainingly engaging the inner channel, and wherein said ends of the shank portions of the outer channel are provided with pin receiving means for receiving pins supporting the skirts of the filter elements; and said structure further comprising substantially U-shaped parallel sealing channels filled with a sealing liquid and receiving ends of the shank portions of the inner and outer channels, receiving the skirts and being disposed at a substantially common level, to form an airtight seal against the passage of air that is intended to flow through the filter elements.

4,683,700

CUT-OFF MECHANISM FOR CLIP ATTACHMENT APPARATUS

Alfred J. Evans, and Francis E. Sarginger, both of Raleigh, N.C., assignors to Tipper Tie, Inc., Apex, N.C.

Filed May 14, 1985, Ser. No. 734,337
Int. Cl.[4] B65B *9/08*
U.S. Cl. 53—138 R **4 Claims**



1. In a clip attachment apparatus of the type for attaching a U-shaped metal clip about gathered material, said material comprising meltable material, said apparatus including means for gathering the material prior to placement of the U-shaped clip about the material, a punch movable toward a fixed die and cooperative with the die for forming the U-shaped clip as a closure about the gathered material, with the clipped and gathered material extending laterally from the formed clip, the improvement comprising in combination:

a material severing mechanism affixed to the apparatus for severing gathered material extending laterally from a clip formed by the punch and die, said mechanism including:

(a) a generally fixed cutting block positioned adjacent one side of the die means and underlying the gathered material;

(b) a heated cutting bar;

(c) means for supporting the bar over and opposed to the cutting block;

(d) control means for transporting the cutting bar toward the block in the direction of the punch travel and against the gathered material to impinge, melt and sever gathered material or away from the block said cutting block including a surface opposed to the cutting bar and including air ejector means attached to the apparatus generally above the surface of the cutting block against which the heated cutting bar impinges; and

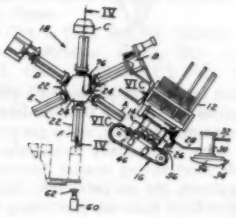
(e) air supply means for providing air through the ejector means and onto material severed by the cutting bar to cool the severed material.

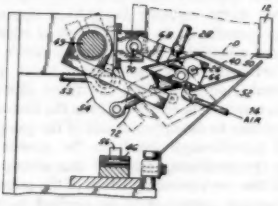
4,683,701

CONTAINER STERILIZATION APPARATUS

Badrudden K. Rangwala, Farmington Hills; Frank A. Rodocker, Milford; Curtis H. Pawloski, and Richard L. Joosten, West Bloomfield, all of Mich., assignors to Ex-Cell-O Corporation, Troy, Mich.

Filed Feb. 13, 1986, Ser. No. 829,045
Int. Cl.[4] A61L *2/00*; **B65B** *55/10*
U.S. Cl. 53—167 **8 Claims**





1. A forming, filling and sealing machine including an indexing mandrel assembly having a plurality of radially extending mandrels and associated heat and tuck and pressure stations; a magazine for storing folded-over, flattened paperboard container blanks whose free edges are sealed together; suction means for removing said folded-over, flattened blanks one-at-a-time from said magazine; feeding means for opening each of said blanks into a four-sided, open-ended tubular blank and placing same on one of its sides on conveyor means; in combination with a sterilization apparatus said sterilization apparatus comprising a source of sterilant under pressure; nebulizing means for receiving said sterilant from said source and dispensing same in a fog state; said nebulizing means being operatively connected to said feeding means so as to be aligned with the opening of each respective tubular blank as it is progressively

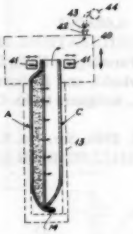
opened while being moved from said magazine to said conveyor by said feeding means, means for dispensing said sterilant fog into and through the adjacent progressively opening end of the blank until just prior to the blank being fully opened and moved toward an axially aligned mandrel of said indexing mandrel assembly by said conveyor means, to thereby provide a maximum sterilizing time for each blank.

4,683,702

METHOD FOR VACUUM-PACKAGING FINELY DIVIDED MATERIALS, AND A BAG FOR IMPLEMENTING THE METHOD

Benjamin Vis, Gavirate, Italy, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 23, 1985, Ser. No. 737,295
Claims priority, application Italy, May 23, 1984, 21053 A/84
Int. Cl.[4] B65B *31/04*
U.S. Cl. 53—433 **2 Claims**



1. A method for vacuum-packaging a powedered material, which comprises providing a first gas-impermeable sheet, a second gas-impermeable sheet, and a gas-permeable sheet, the three sheets being substantially rectangular in shape and the gas-permeable sheet having smaller dimensions than the gas-impermeable sheets, the gas-permeable sheet being impermeable to the powdered material; positioning the gas-permeable sheet on the first gas-impermeable sheet such that the latter peripherally overlaps the former; sealing one edge of the gas-permeable sheet to the corresponding edge of the gas-impermeable sheet; positioning the second gas-impermeable sheet on the opposite side of the gas-permeable sheet such that the former similarly peripherally overlaps the latter; sealing the three sheets together along their opposed edges respectively perpendicular to the first sealed edge; introducing the powdered material at atmospheric pressure into the resulting space between the gas-permeable sheet and the first gas-impermeable sheet; sealing the three sheets together along their corresponding edges opposite the first sealed edge; applying a vacuum to the opposite side of the gas-permeable sheet to extract therethrough gas from the powdered material; and sealing the remaining edge of the second gas-impermeable sheet to the corresponding edges of the other two sheets while such vacuum continues to be applied to the gas-permeable sheet.

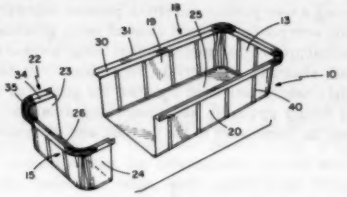
4,683,703

METHOD OF MAKING A TWO-SECTION BAKERY CONTAINER

Morris Rosman, 1104 Lockwood, Buffalo Grove, Ill. 60090

Filed Mar. 17, 1986, Ser. No. 840,209
Int. Cl.[4] B65B *47/00*
U.S. Cl. 53—456 **8 Claims**

1. A method of making an easily detachable twosection flexible container, including the steps of web feeding a fist web of flexible sheeting, web feeding a second web of the same flexible sheeting in partly overlapping engagement with the first flexible sheeting thereby forming a composite web, forming a container from the composite web having a bottom wall and at least one upstanding side wall with one section of the container having a bottom wall portion and a side wall portion defined by the first flexible sheeting and another section of the container having a bottom wall portion and a side wall portion



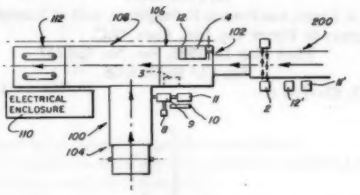
defined by the second flexible sheeting, placing a cover over the container, and crimping upper portions of the side wall portions of the first and second sections over the top of the cover to hold it in position.

4,683,704

METHOD OF AND APPARATUS FOR WRAPPING

Michael J. Vorachek, Sheboygan Falls; Guy P. Entringer, Sheboygan; Otis E. Meives, Cleveland; Gary L. Lynch, Sheboygan, and Anthony J. Lutzke, Elkhart Lake, all of Wis., assignors to Pemco, Inc., Sheboygan, Wis.

Continuation of Ser. No. 543,085, Oct. 18, 1983, abandoned.
This application Aug. 7, 1986, Ser. No. 893,456
Int. Cl.[4] B65B *11/00, 57/16*
U.S. Cl. 53—461 **14 Claims**



1. A production line, particularly for wrapping reams of paper sheets or analogous piles into sheets of wrapping material, comprising a source of piles; a variable-speed wrapping apparatus having means for confining successive piles in sheets of wrapping material, said confining means comprising means for applying sheets of wrapping material to the piles; conveyor means for delivering piles from said source to said confining means at regular and/or random intervals; and means for electronically synchronizing the timing of operation of said wrapping apparatus with the rate of delivery of piles by said conveyor means, said synchronizing means comprising phase adjust loop means for automatically placing the operation of the wrapping apparatus in phase with operation of the source, means for automatically adjusting the spacing between the piles on said conveyor means prior to delivery to said wrapping apparatus including means for changing the speed of the piles, and means for controlling the delivery of piles to said applying means so as to effect such delivery in phase with the operation of said applying means.

4,683,705

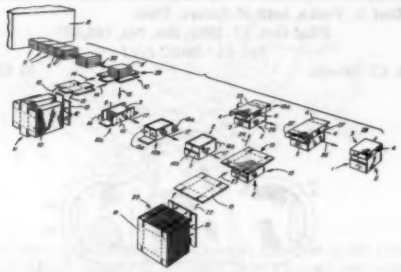
METHOD AND APPARATUS FOR CONFINING WRAPPED REAMS OF PAPER SHEETS IN CARDBOARD BOXES

Otis E. Meives, Cleveland, and Anthony Lutzke, Elkhart Lake, both of Wis., assignors to PEMCO, Inc., Sheboygan, Wis.

Continuation of Ser. No. 730,872, May 3, 1985, Pat. No. 4,610,125. This application Jun. 19, 1986, Ser. No. 876,190

Int. Cl.[4] B65B *11/18*

U.S. Cl. 53—462 **17 Claims**



1. A method of assembling commodities with components of confining means therefor, particularly of confining arrays of paper stacks in converted blanks of cardboard or the like, comprising

(a) the first step of transporting successive commodities to a predetermined position at a first level;

(b) the second step of conveying successive first components into register with the respective commodities in said position;

(c) the third step of jointly moving successive commodities and the respective first components to a second level;

(d) the fourth step of advancing successive commodities and the respective first components along a first predetermined path in a predetermined direction;

(e) the fifth step of converting, not later than in the course of said fourth step, successive first components into receptacles which partially surround the respective commodities;

(f) the sixth step of conveying successive second components of confining means to a predetermined position of register with oncoming commodities and the respective receptacles in a predetermined portion of said first path;

(g) the seventh step of jointly moving the second components with the respective commodities and receptacles to a third level and simultaneously moving the second components with the respective commodities and receptacles in said predetermined direction;

(h) the eighth step of advancing the second components and the respective commodities and receptacles along a second path; and

(i) the ninth step of converting, not later than in the course of said eighth step, successive second components into second receptacles each of which at least partially surrounds the remaining portion of the respective commodity.

4,683,706

APPARATUS AND METHOD FOR INSTALLING LIDS ON CONTAINERS

Chester H. Harper, Aurora, Oreg., assignor to Allen Fruit Co., Inc., Newberg, Oreg.

Filed Aug. 15, 1986, Ser. No. 896,808

Int. Cl.[4] B65B *7/28;* **B67B** *3/22*

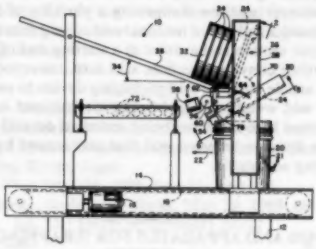
U.S. Cl. 53—485 **6 Claims**

1. Lidding apparatus for placing circular lids, each including a projecting spout structure defining a pour spout location, in a preferred orientation on upwardly open containers, comprising:

(a) means for holding a supply of lids;

(b) lid gate means for releasing said lids one at a time from said means for holding a supply of lids; and

(c) lid placement guide means for orienting each said lid



relative to a respective container, said lid placement guide means including rotatable lid rotator means for engaging said projecting spout structure of each said lid and, by rotation of said rotator means while engaging said spout structure, rotating said lid to said preferred orientation.

4,683,707

SYSTEM FOR PACKAGING, WEIGHING AND LABELING ARTICLES

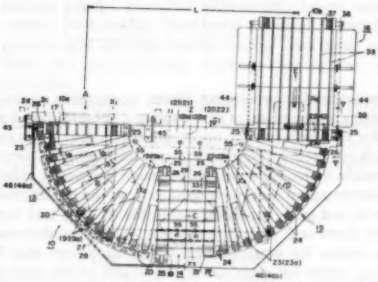
Kazuo Koyama, Kurita, Japan, assignor to Ishida Scales Mfg. Co., Ltd., Kyoto, Japan

Filed Oct. 1, 1985, Ser. No. 782,416

Claims priority, application Japan, Oct. 1, 1984, 59-149352[U]; Oct. 1, 1984, 59-149353[U]; Nov. 1, 1984, 59-232142; Nov. 2, 1984, 59-167210[U]

Int. Cl.[4] B65C *1/02, 9/06, 9/14*

U.S. Cl. 53—502 **14 Claims**



1. A system for packaging, weighting and labeling articles, comprising:

a packaging device for packaging the article;

a weighing and labeling device disposed parallel to said packaging device and having a weighing machine for weighing the article packaged by said packaging device and a labeling machine for printing the price corresponding to the weight measured by said weighing machine and applying the printed label to the article; and

a turn conveyor for turning the article substantially through 90° with respect to the direction of feed while the article is being conveyed by said turn conveyor, said turn conveyor having a mount, first and second base members disposed on said mount, a first turning conveyor section having a plurality of longer and shorter rollers of cylindrical shape arranged alternately in a sectorial pattern on said first base member and providing a conveyor path of a 90-degree arc extending from an inlet thereof, a second turning conveyor section having a plurality of longer and

shorter rollers of cylindrical shape arranged alternately in a sectorial pattern on said second base member and providing a conveyor path of a 90-degree arc extending from an outlet of said first turning conveyor section, means for driving said longer and shorter rollers, and an intermediate conveyor section between said first and second turning conveyor sections comprising a plurality of belts trained around a roller at a terminal end of said first turning conveyor section and a roller at a starting end of said second turning conveyor section, said turn conveyor connecting an article outlet of said packaging device to an article inlet of said weighing and labeling device, and said first and second base members being mounted on said mount with the distance between said first and second base members being adjustable.

4,683,708

METHOD AND APPARATUS FOR WRAPPING PRINTED SHEETS

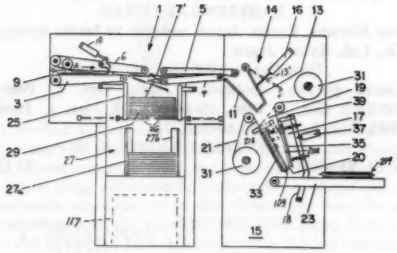
Heinz Linder, Zofingen, Switzerland, assignor to Grapha-Holding AG, Hergiswil, Switzerland

Filed Feb. 25, 1986, Ser. No. 833,330

Claims priority, application Switzerland, Mar. 15, 1985, 1172/85

Int. Cl.[4] B65B *11/50, 35/50*

U.S. Cl. 53—540 **3 Claims**



1. Apparatus for processing sheets, comprising means for transporting a succession of sheets along a predetermined path; means for accumulating the oncoming sheets into a succession of groups in a predetermined portion of said path, said accumulating means including a movable barrier; means for effecting the advancement of successive groups from the predetermined portion of said path, including means for moving said barrier into and from said path downstream of said predetermined portion; means for wrapping the advanced groups into foils, including means for maintaining the sheets of the groups in inclined positions, means for inserting successive groups between pairs of panels of weldable synthetic plastic material, and means for bonding the panels to each other around the respective groups, said accumulating means being disposed at a level above said wrapping means and said advancement effecting means including means for effecting gravitational descent of groups from said accumulating means to said wrapping means; conveyor means for wrapped groups, said conveyor means being disposed at a level below said wrapping means and said wrapping means further comprising means for discharging wrapped groups onto said conveyor means by gravity feed; means for diverting sheets from a second portion of said path ahead of said predetermined portion; means collecting the diverted sheets, including means for accumulating a succession of piles of overlapping sheets; and means for wrapping such piles into foils, said transporting means comprising a first conveyor arranged to advance sheets to the second portion of said path and a second conveyor arranged to advance sheets from the second to the predetermined portion of said path, said diverting means including a switching member movable between a first position in which the sheets leaving said first conveyor are free to advance toward and onto said second conveyor, and a second position in which the sheets leaving said first conveyor are directed into said collecting means.

4,683,709

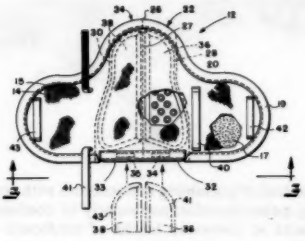
SADDLE PAD

Tanya S. Vasko, and Kent A. Vasko, both of 225 E. Pioneer Trail, Aurora, Ohio 44202, assignors to Tanya S. Vasko and Kent A. Vasko, both of Aurora, Ohio

Filed Oct. 17, 1985, Ser. No. 788,407

Int. Cl.[4] B68C *1/12*

U.S. Cl. 54—66 **31 Claims**



25. An energy absorbing saddle insert including a front end and a back end comprising a visco-elastic shock absorbing material capable of distributing shock in a multi-dimensional manner for use in conjunction with an energy absorbing saddle pad.

4,683,710

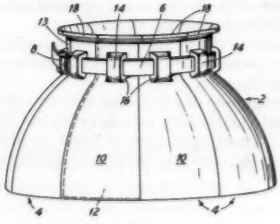
PROTECTIVE EQUIPMENT FOR HORSES

Hilary A. Westropp, Fairview, Saltby, Melton Mowbray, Leicestershire, England, assignor to Hilary Ann Westropp, Leicestershire, England

Filed Feb. 21, 1986, Ser. No. 831,629

Int. Cl.[4] B68C *5/00*

U.S. Cl. 54—82 **14 Claims**



12. An article of protective equipment for horses, ponies and the like, comprising:

a boot adapted to be worn on the lower portion of a foreleg therof;

a leg encircling portion; and

a skirt portion depending from said leg encircling portion, comprising a plurality of overlapping panels, said overlapping panels including an abutting lip portion and upper edge portion to prevent movement between said overlapping panels.

4,683,711
THREAD MONITORING DEVICE

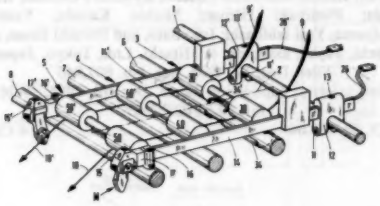
Alfred Glock, Stuttgart, Fed. Rep. of Germany, assignor to SKF Textilmaschinen-Komponenten GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 30, 1986, Ser. No. 880,073

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1985, 3523481

Int. Cl.[4] D01H *13/16, 13/18*

U.S. Cl. 57—81 **9 Claims**



1. In the system for photo-electrically monitoring the continuity of thread running to a spindle from a pair of exit rollers of a drafting frame having double top rollers held by a common pivotal supporting arm, the system including a pair of thread monitoring devices each mounted at the end of a bearing rail arranged parallel to the direction of the running thread, the improvement wherein each monitoring device comprises a light source and light sensitive cells, a housing in which said light source and cells are fixedly mounted, a slider on which said housing is detachably connected in a predetermined position, a guide support in which said slider is held, and a carrier on which said guide support is mounted, said carrier being axially adjustable along said bearing rail, said guide support being mounted to said carrier to pivot about an axis coextensive with the axis of said bearing support rail and said slider being mounted on each guide support adjustable at right angles to the axis of said bearing rail.

4,683,712
SPINNING MACHINE

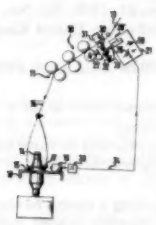
Erwin Peters, Niederzier, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Fed. Rep. of Germany

Filed Jul. 22, 1986, Ser. No. 888,826

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526309

Int. Cl.[4] D01H *13/16*

U.S. Cl. 57—81 **2 Claims**



1. Spinning machine for producing a thread, comprising a multiplicity of spinning stations at which sliver is spun into thread, each of said spinning stations including a thread-break sensor and a slubbing-stopping device connected to said sensor and released by an electrical current from said sensor for arresting the sliver after each thread break sensed by the sensor, each slubbing-stopping device including an electrical capacitor; a charging circuit for said capacitor including a first rectifier, an ohmic resistor connected between said first rectifier and said capacitor, said ohmic resistor being connected to said first rectifier by a first line and to said capacitor by a second line, a coil, another rectifier connected to said second line by a third line and to said coil by a fourth line for permitting discharge current to flow from said capacitor to said coil, and a fifth line connected from said fourth line to said first line; and means for discharging said capacitor for operating said slubbing-stopping device.

4,683,713
BOBBIN FEEDING SYSTEM

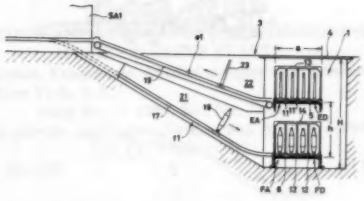
Isamu Matsui; Hidetoshi Kimura, both of Kyoto, and Kazuo Nakanishi, Uji, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed May 16, 1986, Ser. No. 863,955

Claims priority, application Japan, May 20, 1985, 60-109072

Int. Cl.[4] D01H *9/02;* **B65H** *54/22*

U.S. Cl. 57—281 **8 Claims**



1. A system for feeding bobbins, comprising:

one or more spinning bobbin feeding lines and one or more empty-bobbin feeding lines connecting one or more spinning frames with one or more winders, said spinning frames and said winders being supported by a floor surface,

a feeding groove provided substantially below said floor surface, said feeding lines being disposed in said feeding groove, said spinning bobbin feeding lines being separate from said empty-bobbin feeding lines in the vertical direction,

an endless conveyor belt supported by rollers to thereby define an upper flat and a lower flat of the endless conveyor belt, said upper flat and said lower flat being spaced by a distance not less than the maximum length of said bobbins.

4,683,714
OIL SCAVENGE SYSTEM

Glenn W. Thebert, Carmel, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 17, 1986, Ser. No. 875,176

Int. Cl.[4] F02C *7/06*

U.S. Cl. 60—39.02 **6 Claims**

1. In a gas turbine engine having

a case assembly defining a main axis of said engine,

a main shaft,

a bearing assembly between said case assembly and said main shaft supporting said main shaft on said case assembly for rotation about said main axis, and

oil supply means operative to direct a cooling and lubricating flow of oil to said bearing assembly,

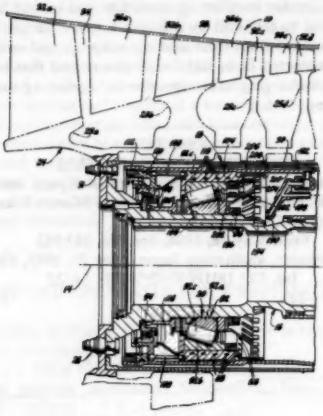
an oil scavenge system comprising:

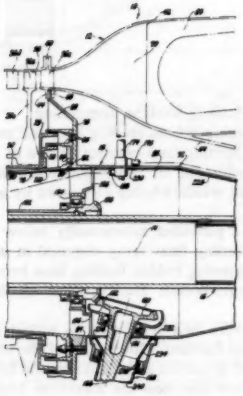
means on said case assembly defining a sump having one end exposed to said bearing assembly,

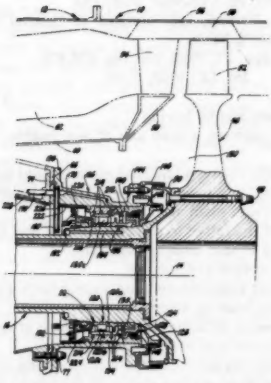
means on said sump defining an inner surface around said main axis adjacent said bearing assembly,

means on said bearing assembly operative to pump oil therefrom onto said inner surface with high tangential velocity so that said pumped oil centrifugally adheres to said inner

surface and retains sufficient tangential velocity to form a centrifugally adhered annular pool of oil on said inner surface,







means on said sump defining a drain entry in said inner surface at the bottom of said annular oil pool thereon so that said oil drains from said annular pool into said drain entry, and

scavenge pump means on said engine connected directly to said drain entry and operative to exhaust from said sump all oil draining from said annular pool into said drain entry.

4,683,715

METHOD OF STARTING GAS TURBINE PLANT

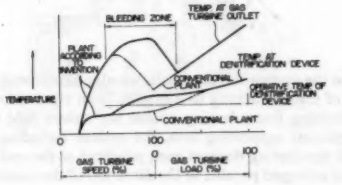
Nobuyuki Iizuka; Katsukuni Hisano; Ryoichiro Oshima; Katsuo Wada; Fumiyuki Hirose; Michio Kuroda; Yoshihiro Uchiyama; Yoji Ishibashi; Isao Sato, and Hiroshi Inose, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 12, 1985, Ser. No. 807,945

Claims priority, application Japan, Dec. 14, 1984, 59-262782

Int. Cl.[4] F02C *7/26*

U.S. Cl. 60—39.06 **4 Claims**



1. A method of starting a gas turbine of the type having: at least one combustor including a primary combustion chamber provided with means for supplying primary fuel thereinto and primary air supply ports, and a secondary combustion chamber downstream from said primary combustion chamber and provided with means for supplying secondary fuel into said secondary combustion chamber and secondary air supply ports; a compressor for supplying said combustor with compressed combustion air; and a gas turbine driven by a combustion gas generated in said combustor; said method comprising: commencing bleeding of a part of said compressed air to reduce the rate of supply of said combustion air to said combustor after the combustion of the primary fuel is commenced; and then commencing the combustion of the secondary fuel.

4,683,716

BLADE TIP CLEARANCE CONTROL

William B. Wright, Leicester, and Richard J. Flatman, Derby, both of England, assignors to Rolls-Royce plc, London, England

Filed Dec. 31, 1985, Ser. No. 815,059

Claims priority, application United Kingdom, Jan. 22, 1985, 8501554

Int. Cl.[4] F02K *3/02, 1/46;* **F03D** *11/00*

U.S. Cl. 60—226.1 **11 Claims**

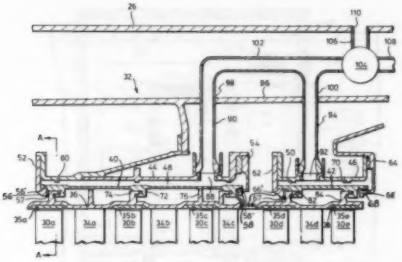
1. A blade tip clearance control for a compressor of a gas turbine engine comprising:

rotor means having plurality of rotor blades extending radially outwardly therefrom and being arranged circumferentially thereon;

stator means comprising a casing having an inner surface, a cylindrical wall member spaced radially inwardly from inner surface of said casing and having axial ends in sealing engagement with said casing to define a chamber therebetween, said cylindrical wall chamber and said axial ends thereof being movable as a unit radially toward and away from said inner surface of said casing in response to pressure changes in said chamber, radially inner stops on said casing adjacent at least each end thereof for abutting said axial ends of said cylindrical wall member to limit radial movement of said cylindrical wall member away from said inner surface of said casing, radial outer stops on

said casing adjacent at least each end thereof for abutting said axial ends of said cylindrical wall member to limit radial movement of said cylindrical wall member towards said inner surface of said casing;

means for selectively varying pressure in said chamber to control movement of said cylindrical wall member and the axial ends thereof between said radially inner stops and said radially outer stops;



a ring of circumferentially arranged shroud segments defining a boundary flow path of said compressor, said ring shroud segments being spaced radially outwardly of said rotor blades by a clearance; and

means carrying said shroud segments from said cylindrical wall member for movement therewith when said cylindrical wall member moves between said inner stops and said outer stops.

4,683,717

STRUCTURAL COWLINGS OF TWIN FLOW TURBO JET ENGINES

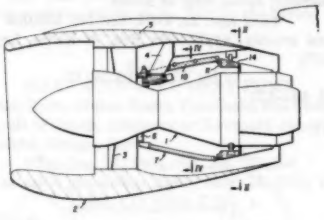
Henry Naud, Verrieres Le Buisson, France, assignor to Societe Nationale d'Etude et de Construction de Moteur d'Aviation "S.N.E.C.M.A.", Paris, France

Filed Feb. 20, 1985, Ser. No. 703,439

Claims priority, application France, Mar. 7, 1984, 84 03509

Int. Cl.[4] F02K *3/02*

U.S. Cl. 60—226.1 **12 Claims**



1. In a twin-flow turbo-jet engine,

a casing comprising a compressor, a combustor and a turbine, defining a path for a first flow and having upstream flange means, and downstream flange means;

inner structural cowling means in the form of two half-shells;

outer cowling means wherein said inner and outer cowling means define between them a path for a second flow downstream of a fan;

means for mounting the half-shells to said upstream and downstream flanges of the casing; and

at least one securing assembly interconnecting the inner structural cowling means and one of the casing flange means, said securing assembly comprising means for enabling free thermal expansion of the casing relative to the inner structural cowling wherein the securing assembly includes slide means enabling free differential longitudinal expansion between the casing and the inner cowling means and wherein the securing assembly further comprises at least three, regularlyspaced, axial pin assemblies, each pin assembly comprising:

a first element in the form of a pin, and

a second element in the form of a spherical body with a central bore,

an end portion of the pin engaging in the bore of the spherical body,

means for securing one said element to the engine casing, and

housing means accommodating the spherical body, the housing means being connected to one of the half-shells of the inner cowling means.

4,683,718

METHOD AND APPARATUS FOR MONITORING HYDRO TURBINE PLANTS

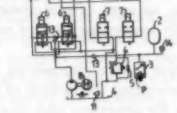
Hans Larsson, Kungsangen, Sweden, assignor to ITT Industries, Inc., New York, N.Y.

Filed Sep. 4, 1985, Ser. No. 772,294

Claims priority, application Sweden, Sep. 5, 1984, 8404441

Int. Cl.[4] F16D *31/00*

U.S. Cl. 60—327 **6 Claims**



1. An apparatus for monitoring and controlling the operation of hydro turbines adjacent a water dam comprising:

a groove in said water dam having a predetermined cross-sectional area on the same level as the nominal level of the dam;

level indicating means arranged in said groove to detect the water level in the dam at predetermined intervals and to generate signals in response to the detected levels, said signals generated indicating the presence of at least first, second and third preselected water levels in the dam;

operating means for controlling the start and stop of the turbines and being controlled by said generated signals, said operating means responsive to generated signals representative of said first preselected level enabling one of said turbines to be started with the vane angles thereof set to a minimum condition;

means responsive to said generated signals for adjusting the vane angles of said one of said turbines, said means responsive acting in response to generated signals representative of a water level equal to or exceeding said second level to increase said vane angles of said one of said turbines after the same has been started, said means responsive further acting in response to continued generated signals representative of a water level remaining equal to or exceeding said second level to further increase said vane angles of said one of said turbines to a maximum value with respect to available water, and said means responsive acting to decrease said vane angles in response to generated signals representing said third water level.

4,683,719

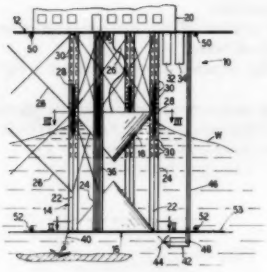
MAN MADE FLOATING ISLAND

Bonifac Martinak, 2639 Grove Ave., Berwyn, Ill. 60402

Filed Dec. 27, 1985, Ser. No. 813,967

Int. Cl.[4] F16D *31/02*

U.S. Cl. 60—398 **15 Claims**



1. An artificial island for use in energy production from ocean waves, comprising:

a platform disposed atop the ocean surface,

a plurality of vertically disposed rigid posts extending beneath said platform short of the ocean floor,

a stationary wave amplifier affixed to said posts, said wave amplifier of a conical shape with inclined sides for directing water upwardly from substantially any lateral direction when submerged to amplify wave action,

a movable inverted conical float slidably mounted for translational movement along said posts and disposed between said platform and said wave amplifier for movement with said waves, an apex of said conical float being directed substantially toward an apex of said conical wave amplifier,

an energy-drive device disposed on said platform, and

means for converting the motion of said float to transmittable energy for operating said energy-driven device.

4,683,720

BUOYANCY ENGINE UTILIZING PISTONS AND CRANKSHAFT

Dennis A. De Shon, P.O. Box 3255, Baton Rouge, La. 70821

Continuation-in-part of Ser. No. 771,363, Aug. 30, 1985, abandoned. This application May 2, 1986, Ser. No. 858,697

Int. Cl.[4] F03B *17/02*

U.S. Cl. 60—496 **1 Claim**

1. A buoyancy engine utilizing pistons and crankshaft, comprising:

a plurality of cylinders, disposed in a vessel contained liquid;

said vessel sitting on a base and having an air exhaust orifice at its top;

a plurality of hydrodynamically designed pistons, disposed within said cylinders, designed with air holding spaces to hold injected air, and attached by connecting rods to a hydrodynamically designed crankshaft;

sealed connecting rod bearings which connect the piston rods to the crankshaft;

wrist pins which connect the piston rods to the pistons;

said crankshaft supported on sealed bearings in the vessel walls, and which is rotated by the upward motion of the relatively buoyant pistons which are attached;

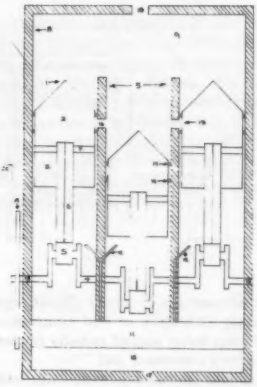
said crankshaft designed so that its lobes to which the pistons are attached are at angles which insure that power developed by pistons in their lift cycle is successively converted into continuing rotational force on the crankshaft;

computer-controlled air injectors, programmed to crankshaft rotational speed, positioned to inject air, compressed by a compressor, into the pistons at the bottom of each piston's stroke;

said pistons having pistons rings to retain the air in the piston during its upward power stroke;

said pistons having vents incorporated into their design for the release of air at the top of their power stroke;

an exhaust port in each cylinder which conducts air released from pistons to be released into the ambient liquid;



a flywheel attached to the crankshaft, which stores a part of the mechanical energy produced, and which provides continuity to the series of energy developing cycles of the pistons;

a generator attached to the crankshaft, which produces electric power from the rotation of the crankshaft.

4,683,721

TWIN-CRANK TYPE HEAT ENGINE

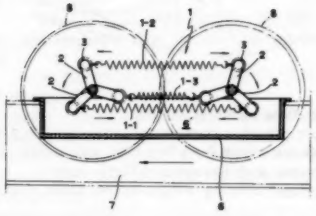
Myung Chul Shin, Seoul; Chil Sung Kim, Incheon; Young Hoon Chung, and Kwang Koo Jee, both of Seoul, all of Rep. of Korea, assignors to Korea Advanced Institute of Science & Technology, Seoul, Rep. of Korea

Filed Apr. 22, 1986, Ser. No. 855,018

Claims priority, application Rep. of Korea, Sep. 12, 1985, 1985-6671

Int. Cl.[4] F01B *29/10*

U.S. Cl. 60—527 **1 Claim**

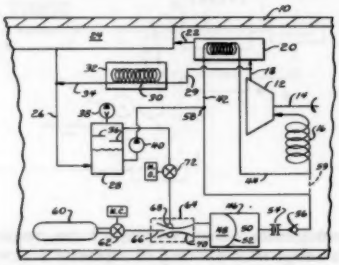


1. A twin-crank type engine comprising: two crank shafts arranged symetrically with each other and partially submerged in a hot water vessel, power elements tightly coiled with shape memory metal wire and mounted between said crank shafts by means of sliding members, said power elements being able to perform a vertically reciprocating motion in parallel with the surface of the hot water in the vessel, and a mechanism for simultaneously rotating said crank shafts in the vessel.

4,683,722
CHARGING AND EJECTION SYSTEM FOR RANKINE APPARATUS

Michael E. Ewbank, and Steven Heitz, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed May 20, 1986, Ser. No. 864,871
Int. Cl.[4] F01K 13/02
U.S. Cl. 60—656 9 Claims



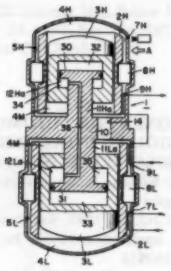
1. A Rankine cycle system comprising:
a boiler;
an engine for receiving condensible working fluid from the boiler;
a pressurizable reservoir for working fluid for providing working fluid to the boiler;
a condenser for receiving working fluid from the engine and condensing the same;
a conduit interconnected the boiler, engine, reservoir and condenser;
a source of pressure fluid;
an ejector having a pressure fluid inlet, an ejection fluid inlet connected to said conduit, and an outlet, said outlet being connected to said reservoir; and
a selectively operable valve interconnecting said source and said pressure fluid inlet;
whereby operation of said valve to interconnect said source and said pressure fluid inlet will (1) result in pressured fluid passing through said ejector to draw noncondensibles from said conduit, said condenser, said engine and said boiler, and (2) provide said reservoir with said pressure fluid and noncondensibles to elevate the pressure therein to drive the working fluid to the boiler.

4,683,723
HEAT ACTIVATED HEAT PUMP

Yoshiki Doi, Kobe; Mitsuo Inabe, Funabashi, and Osamu Noro, Akashi, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan

Filed Jun. 24, 1986, Ser. No. 877,964
Claims priority, application Japan, Mar. 25, 1986, 61-66620
Int. Cl.[4] F25B 9/00
U.S. Cl. 62—6 7 Claims

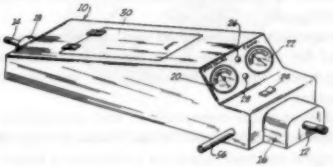
1. A heat activated heat pump for converting thermal energy of heat sources into compression and expansion energy of working gas to pump heat, which comprises:
(a) casing means filled with working gas therein;
(b) hot cylinder means accommodated in the casing means on its one side;
(c) cold cylinder means accommodated in the casing means on its other side;
(d) hot displacer means received slidably in the hot cylinder means so that a hot chamber is formed on the side opposite to the cold cylinder means with respect to the hot displacer means and that an intermediate chamber is formed on the side of the cold cylinder means with respect to the hot displacer means;
(e) working gas passage means on the hot side communicating between the hot and intermediate chambers;
(f) hot heat exchanger means, hot regenerator means and intermediate heat exchanger means on the hot side arranged in the working gas passage means on the hot side in this order in the direction from the hot chamber to the intermediate chamber;
(g) cold displacer means received slidably in the cold cylinder means so that a cold chamber is formed on the side opposite to the hot cylinder means with respect to the cold displacer means and that the intermediate chamber is formed on the side of the hot cylinder means;
(h) working gas passage means on the cold side communicating between the cold and intermediate chamber;
(i) cold heat exchanger means, cold regenerator means and intermediate heat exhanger means on the cold side arranged in the working gas passage means on the cold side in this order in the direction from the cold chamber to the intermediate chamber;
(j) guide means provided, in a fixed state, between the hot and cold cylinder means for guiding the hot and cold displacer means in their axial directions, the guide means being engaged slidably with the hot and cold displacer means so that two gas chambers are respectively formed between the two displacer means and the guide means, the two gas chambers being filled with working gas so as to function as a gas spring for oscillating the two displacer means.



4,683,724
REFRIGERATION MOISTURE ELIMINATING DEVICE AND METHOD

Jorge Vergel, Jr., Belle Glade, Fla., assignor to V. M. International, Inc., Belle Glade, Fla.

Filed Oct. 28, 1985, Ser. No. 792,219
Int. Cl.[4] F25B 47/00
U.S. Cl. 62—85 27 Claims



1. Apparatus for removing moisture from a refrigeration unit, said refrigeration unit including a compressor, a condenser and an evaporator coupled in a loop, said refrigeration unit further including a low pressure side valve between said compressor and said evaporator and a high pressure side valve between said condenser and evaporator, said apparatus comprising:
output coupling means adapted for being coupled to said low pressure side valve when opened;

input coupling means adapted for being coupled to a source of a dry gas;

gas transfer and heating means, positioned between said output coupling means and input coupling means, for transferring and heating dry gas applied through said input coupling means to said output coupling means;

sensing means for sensing the temperature and pressure of said dry gas transferred to said output coupling means; and

means for manifesting the sensed temperature and pressure to indicate when to close said low pressure side valve.

4,683,725

AIR CONDITIONER FOR AUTOMOTIVE VEHICLES CAPABLE OF COOLING INTAKE AIR SUPPLIED TO AN INTERNAL COMBUSTION ENGINE

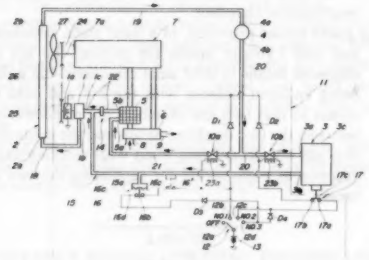
Hiroyuki Sugiura, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jul. 25, 1985, Ser. No. 759,084

Claims priority, application Japan, Jul. 31, 1984, 59-160822; Jul. 31, 1984, 59-160823

Int. Cl.[4] F25B *5/00*

U.S. Cl. 62—199 **12 Claims**



9. An air conditioner for use in an automotive vehicle having an internal combustion engine having an intake air system with an intake port and an intake passage, and means arranged in said intake system for compressing intake air, and a passenger compartment, comprising a refrigerant cycle means wherein a refrigerant is circulated, said refrigerant cycle means comprising:

a compressor of variable displacement type for compressing said refrigerant,

a first evaporator connected to said compressor at an inlet thereof for cooling air to be blown into the passenger compartment through heat exchange thereof with said refrigerant,

a second evaporator connected to said compressor at the inlet thereof and arranged in said intake passage between said engine and said means for compressing intake air for cooling air to be taken into the engine through heat exchange thereof with said refrigerant,

sensing means for detecting a parameter representing one of the boiling pressure of said refrigerant in said first evaporator, and pressure of refrigerant being supplied to said compressor; and

switch means for causing said first evaporator alone to continue operating when said parameter detected by said sensing means has a value exceeding a predetermined value.

4,683,726

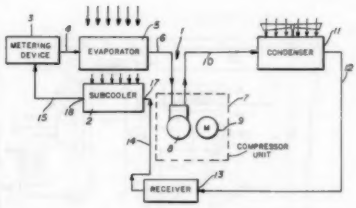
REFRIGERATION APPARATUS

Edward J. Barron, Spring, Tex., assignor to Rejs Co., Inc., Las Vegas, Nev.

Filed Jul. 16, 1986, Ser. No. 886,015

Int. Cl.[4] F25B *43/00*

U.S. Cl. 62—503 **25 Claims**



1. A refrigeration system comprising a compressor, a condenser, a refrigeration metering or expansion device, and an evaporator connected in series with the outlet of the compressor being connected to the inlet to the condenser to conduct compressed refrigerant gas thereto, the outlet of the condenser connected to the inlet of the evaporator to conduct liquid refrigerant thereto, and the outlet of the evaporator connected to the inlet to the compressor to conduct vaporized refrigerant thereto, said system including means circulating air over said evaporator to provide cold air to a selected space,

further including

a refrigerant final condenser/cooler connected between the outlet from said condenser and the inlet to said metering or expansion device and positioned adjacent to said evaporator whereby the flow of cold air from said evaporator over said final condenser/cooler pre-cools the hot gas refrigerant flowing therebetween by vaporization of part of the liquid refrigerant flowing therethrough,

said final condenser/cooler comprising a hollow housing defining a closed chamber,

a conduit extending into said chamber having an inlet connected to receive liquid refrigerant flowing from said condenser and a free end terminating in said chamber having an end closure and a plurality of orifices for spraying liquid refrigerant therethrough, said sprayed liquid refrigerant collecting in the bottom of said chamber, and

said housing having an outlet below the level of liquid in said chamber and connected to said metering or expansion device,

whereby the flow of cold air over said housing and expansion of said sprayed liquid refrigerant are operable to cool the liquid refrigerant is said housing and flowing to said metering or expansion device.

4,683,727

THREAD GUIDE RAIL FOR CROCHET GALLOON MACHINES

Luigi Omodeo Zorini, Cilavegna, Italy, assignor to Comez S.p.A., Cilavegna, Italy

Filed Dec. 3, 1986, Ser. No. 937,380

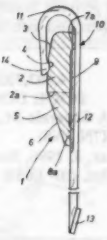
Claims priority, application Italy, Mar. 7, 1986, 21154/86[U]

Int. Cl.[4] D04B *23/00*

U.S. Cl. 66—207 **3 Claims**

1. A thread guide rail for crochet galloon machines, of the type having a rectangular cross section on the major base of which is obtained an inclined flat provided with a longitudinal groove extending over the whole length of the rail itself and comprising a plurality of transverse grooves disposed side by side on the surface opposite said inclined flat, a plurality of thread guide elements being engageable with said thread guide rail, each of said elements exhibiting a rectilinear portion followed by a U-shaped portion provided, at the free end thereof,

with a fitting projection and said thread guide element being adapted to be coupled to the thread guide rail by the engagement of said fitting projection into said longitudinal groove as well as of said rectilinear portion into one of said transverse grooves, wherein said thread guide rail comprises two series of



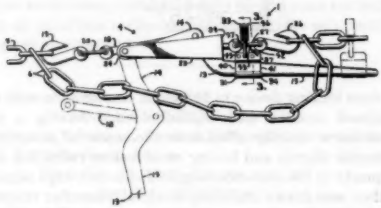
said transverse opposite grooves disposed in alignment with each other and between which a central recessed portion is defined which extends longitudinally over the whole length of said thread guide rail, said grooves exhibiting, in cross-section, a profile mating with the profile of the corresponding section of said rectilinear portion.

4,683,728

LOCKING DEVICE

Michael L. Hailey, Joplin, Mo., assignor to Transportation Specialties, Inc., Joplin, Mo.

Filed May 27, 1986, Ser. No. 867,153
Int. Cl.[4] B66F *3/00*; E05B *73/00*
U.S. Cl. 70—14 **3 Claims**



1. In combination with a load chain including a plurality of links and a load binder including a lever with clevis and handle sections, a drawbar pivotably connected to the lever clevis section and connected to a proximate hook, a hook clevis pivotably connected to the lever clevis section at a proximate end thereof and connected to a distal hook by a distal hook connector link at a distal end thereof, said lever handle section being positioned in proximity to said hook clevis distal end and each said hook receiving a respective chain link with said load binder in a closed position, the improvement of a locking device, which comprises:

(a) a body integrally formed from flat sheet stock and including:

(1) a proximate end;

(2) a distal end;

(3) a cylindrical tube with a bore extending therethrough between said body ends and receiving said lever handle section; and

(4) a pair of flange halves welded together from inside said bore in juxtaposed relation to form a longitudinally-extending flange, said flange having a plurality of transversely-extending shackle receivers and a transversely-extending tether chain fastener receiver;

(b) a padlock including a shackle extending through a respective shackle receiver and extending through one of said distal hook connector link and a respective load chain link whereby said load binder is secured in its closed position;

(c) a tether chain attached to said flange and including a first link adapted to receive said padlock shackle and a second link; and

(d) a tether chain fastener extending through said tether chain fastener receiver and said tether chain second link.

4,683,729

ANTI-THEFT APPARATUS FOR A RIDING SADDLE

Kermett A. Rogers, 7220 Hooper Rd., Baton Rouge, La. 70811

Filed Jun. 24, 1985, Ser. No. 747,765
Int. Cl.[4] E05B *73/00*
U.S. Cl. 70—58 **11 Claims**

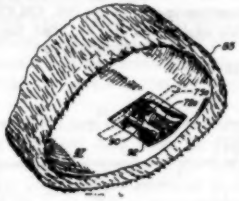
1. In combination with a riding saddle including a saddle horn having a neck, a means for preventing the theft of said saddle, comprising a lock ring, having an interior diameter just greater than that of said neck, said ring being lockable around said neck and connectable to a tether.

4,683,730

SHORT-TERM FUR SECURITY SYSTEM

Michaelina Lee, 6236 Trancas Canyon Rd., Malibu, Calif. 90265

Filed Jul. 12, 1985, Ser. No. 754,797
Int. Cl.[4] E05B *69/00*
U.S. Cl. 70—59 **8 Claims**



6. A security system for preventing theft of a garment comprising:

first and second bracket members, each of which comprises first and second hinge portions having an aligned configuration and an opposed configuration, and a member having a portion defining a hinge pin for hingedly fastening said first and second hinge portions together, and further having a portion defining an anchor element; and

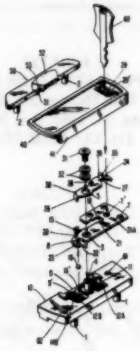
locking means adapted to lock the anchor elements of said first and second bracket members together so that said garment may be secured to a fixed structure by locking said anchor elements so that said garment forms a closed loop around said fixed structure.

4,683,731

LATCHING DEVICE

John A. Wickman, Swansea, Mass., and John J. Killian, III, Warren, R.I., assignors to American Tourister, Inc., Warren, R.I.

Filed Aug. 30, 1985, Ser. No. 771,304
Int. Cl.[4] E05B *65/52*
U.S. Cl. 70—69 **13 Claims**



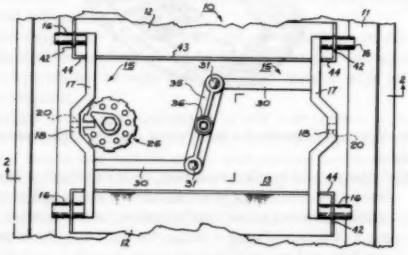
1. A latching device for engaging a hasp, comprising:
a base frame having a stop shoulder;
a manually operable latch member pivotally mounted to said base frame for rotation relative thereto about an axis of rotation, said latch member having a hasp engaging finger;
a spring member pivotally mounted for rotation relative to said latch member and said base frame about said axis of rotation, said spring member having a flange means and means for being engaged by a key for rotating said spring member such that said flange means is moved to a position for lockingly engaging said stop shoulder and locking said latch member against movement in a hasp disengaging direction.

4,683,732

LIVE BOLT ASSEMBLY FOR SAFE DOOR

Patrick J. Beattie, Henrietta, N.Y., assignor to John D. Brush & Co., Inc., Rochester, N.Y.

Continuation of Ser. No. 712,810, Mar. 15, 1985, abandoned, which is a continuation-in-part of Ser. No. 520,438, Aug. 4, 1983, abandoned. This application Jul. 21, 1986, Ser. No. 888,517
Int. Cl.[4] E05B *63/14*
U.S. Cl. 70—118 **33 Claims**



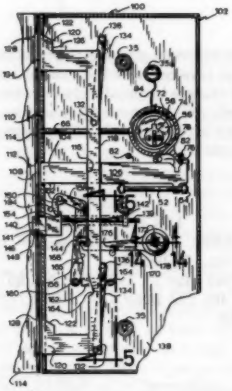
1. A safe door live bolt assembly comprising:
a. a pair of slide brackets braced across said door, with opposite end regions of each of said slide brackets having live bolt support holes, and each of said slide brackets having a bracing surface extending in a direction parallel with and offset from a live bolt motion path through said holes; and
b. two pairs of live bolts mounted for sliding movement in said support holes, each pair of said live bolts being connected by an interconnecting bracket that engages and slides along said bracing surfaces at a distance from said support holes to provide bracing leverage resisting force applied to pry open said safe door.

4,683,733

DOOR LOCK

Manuel Marin, 9060A Copernic St., Saint Leonard, H1R 3N4, Québec, Canada (H7N 2N5)

Filed Mar. 3, 1986, Ser. No. 835,875
Int. Cl.[4] E05B *65/06*
U.S. Cl. 70—134 **7 Claims**



1. A door locking device to be used in combination with two conventional co-axial lock cylinders each having a key-operated barrel radially offset from the center of its cylinder and rotatable therein and having an actuating radial lug at its end opposite to the key-receiving end, the two lugs adjacent each other, said device including an annular member rotatably mounted around said two cylinders and including an inner projection in the path of both actuating radial lugs and an outer radial operating arm, a bolt member, means to guide said bolt member for movement between a retracted door unlocking position and an advanced door locking position, said bolt member having a V-shaped notch continuously engaged by said operating arm throughout rotation of said annular member, said notch having a side substantially normal to said arm and engaging said arm in the advanced position of said bolt member and in the corresponding rotated position of said annular member, whereby said arm positively maintains said bolt member in advanced position while said barrels can be rotated back to a position to permit removal of keys from within said barrels.

4,683,734

LOCKED COVER FOR AIR CONDITION RESPONSIVE CONTROLLER

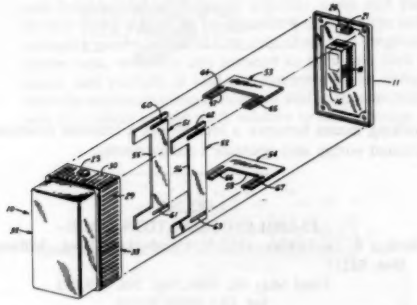
Carroll T. Peterson, 3123 Hayes St. NE., Minneapolis, Minn. 55418

Filed Jun. 19, 1986, Ser. No. 876,176
Int. Cl.[4] B65D *55/14*
U.S. Cl. 70—163 **9 Claims**

1. A locked cover for surrounding a wall mounted air condition responsive controller having means for adjusting the control setting thereof, said cover preventing unauthorized adjustment of the setting of said controller;

a member designed to be secured to a wall in such a manner as to be positioned outwardly from the periphery of that portion of an air condition responsive controller which is secured to the wall;

a cover shaped to be secured to the member and having means for locking the cover to the member, the cover having a front wall and side walls and apertures through portions of the side walls for allowing air to enter the cover and circulate in air condition exchange relationship with the controller; and



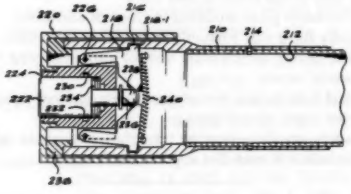
baffle members secured to the cover inside thereof in spaced relation to the cover side walls, the baffle members including solid portions lying in interfering relation between the side wall apertures and the controller so as to prevent tools from being inserted through the apertures to adjust the setting of the controller, the baffle members not extending over the full depth of the cover side walls so as to allow air entering the apertures to flow around the baffles into air condition exchange relation with the air condition responsive controller.

4,683,735

VEHICLE SECURITY DEVICES

Brian Magrobi, Mondeor, South Africa, assignor to Johan C. Genis, Pretoria, South Africa

Filed Feb. 25, 1986, Ser. No. 832,967
Int. Cl.[4] B65D *55/14*
U.S. Cl. 70—168 **4 Claims**



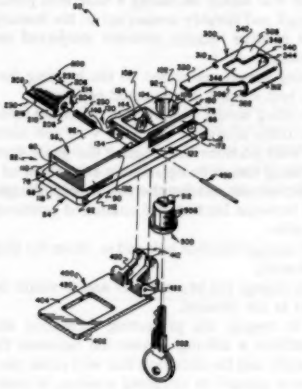
1. A lockable closure for the exhaust pipe of an internal combustion engine including an extender tube adapted for securement coaxially onto the end of the exhaust pipe, a lockable cap removably securable onto the end of the extender tube which includes an inwardly directed locating formation constituted by a groove extending circumferentially about the inner surface of the extender tube, the cap including one or more expandable jaws adapted to project into the extender tube and releasably to engage the locating formation when the cap is in position on the extender tube and a locking mechanism constituted by a cylinder lock including one or more locking pins which are adapted to extend outwardly into a pin locating formation constituted by a circumferential groove formed in a lock housing in the cap, the locking mechanism being adapted to allow the passage of a certain amount of exhaust gas under pressure when the extender tube is secured on the exhaust pip and the cap is locked into position on the extender tube and the jaws being lockable in the engaged position to lock the cap on the end of the extender tube.

4,683,736

CABINET LOCK WITH RECESSED HANDLE

Lee S. Weinerman, Strongsville; Michael J. Rachocki, Brunswick, and John E. Giarrizzo, Macedonia, all of Ohio, assignors to The Eastern Company, Cleveland, Ohio

Continuation of Ser. No. 601,648, Apr. 18, 1984, abandoned.
This application Apr. 28, 1986, Ser. No. 859,194
Int. Cl.[4] B60R *25/02*
U.S. Cl. 70—208 **23 Claims**



1. A low profile cabinet lock, comprising:

(a) a one-piece structure including an elongate front wall and an elongate back wall that are relatively closely spaced, and a pair of opposed, elongate side walls, with the front, back and side walls cooperating to define a relatively thin, elongate housing, and with the elongate side walls of the body structure extending substantially parallel to each other and defining the width of the housing;

(b) the housing additionally having:

(i) first formation means defining a forwardly facing cavity for receiving and nesting at least portions of an operating handle, and the housing having an opening formed through the back wall that communicates with the cavity;

(ii) second formation means defining a passage that opens through the front and back walls for receiving and rotatably mounting a key cylinder for movement between locked and unlocked positions in response to operation of the key cylinder using an appropriately configured key;

(iii) third formation means defining a slide bolt channel that opens through one of the side walls and through the back wall for receiving and slidably mounting a slide bolt;

(iv) fourth formation means including:

(A) guide formations defined along the opposed side walls for receiving and slidably mounting opposed side wall portions of an operating member such that the operating member can move closely alongside the back wall in a direction paralleling the length of the housing as guided by the guide formations, and with the guide formations including grooves that are formed in the recessed side wall surfaces, the grooves

extending along the recessed side wall surfaces in directions that parallel the length of the housing; and,

(B) a pair of elongate, recessed side wall surfaces that are inset from the elongate side walls that define the width of the housing, with the recessed side wall surfaces extending substantially parallel to the length of the housing;

(c) operating handle means including an operating handle pivotally connected to the housing for movement between nested and extended positions relative to the housing, the handle having portions that extend into the cavity, and having a rearwardly projecting portion that extends through the back wall opening;

(d) key cylinder means including a key cylinder positioned in the passage and rotatably connected to the housing for movement relative thereto between locked and unlocked positions in response to the key cylinder's being operated using an appropriately configured key;

(e) slide bolt means including a slide bolt positioned in the channel and slidably connected to the housing for movement relative thereto between projected and retracted positions;

(f) biasing means connected to the housing for biasing the slide bolt toward its projected position;

(g) operating means including an operating member extending closely alongside the back wall and having opposed side wall portions that engage the guide formations, the operating means being slidably connected to the housing for movement relative thereto closely alongside the back wall between latched and unlatched positions, and being operable:

(i) to engage the slide bolt and to retain the slide bolt in the channel;

(ii) to engage the key cylinder and to retain the key cylinder in the passage;

(iii) to engage the projecting formation means and to establish a driving connection between the operating handle and the slide bolt that will cause the slide bolt to move toward its retracted position in response to pivotal movement of the operating handle toward its extended position; and,

(iv) to engage and to cooperate with the key cylinder when the key cylinder is in its locked position to retain the operating handle in its nested position and to retain the operating member in its latched position; and,

(h) the operating member being formed by a stamped metal part that has a base wall that interconnects the opposed side wall portions and that extends closely alongside the back wall of the housing, with the opposed side wall portions of the operating member (i) extending substantially parallel to each other, (ii) lying closely alongside the recessed side wall surfaces of the body, (iii) engaging the guide formations, and (iv) defining the width of the operating member, with the width of the operating member being substantially the same as the width of the body.

4,683,737

ANTI-THEFT DEVICE

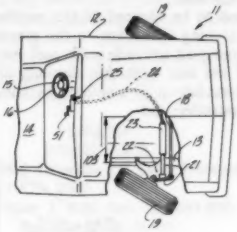
Ennels D. Armstrong, 505 Kirts, Troy, Mich. 48084

Filed Nov. 1, 1984, Ser. No. 667,085

Int. Cl.[4] E05B *65/12*

U.S. Cl. 70—253 **8 Claims**

1. In an anti-theft device for a motor vehicle having a pair of dirigible front wheels each rotatably journaled on a respective spindle, a steering arm affixed to each spindle, a tie rod pivotally connected at its ends to each of said steering arms for simultaneous steering movement of said spindles, steering means for steering one of said steering arms, and an operator's compartment, a steering wheel and steering shaft located in said operator's compartment and rotatable under operator control, and steering means interconnecting said steering shaft with said one of said steering arms for steering said front wheels, the improvement comprising selectively operable locking means directly engageable with one of said steering arms for preventing steering of said front wheels by said steering shaft and operating means for selectively operating said



locking means between a locked and a released position and located within said operator's compartment.

4,683,738

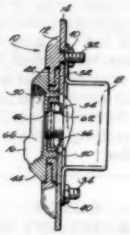
FLUSH COMBINATION LOCK

Nathan L. Berkowitz, 4762 N. Cumberland Blvd., Milwaukee, Wis. 53211

Filed May 30, 1986, Ser. No. 868,691

Int. Cl.[4] E05B *37/08*

U.S. Cl. 70—332 **5 Claims**



1. A combination lock comprising

a case enclosing lock works including permutation discs and a key operated mechanism, said case being mounted behind and protected by a door,

a key hole in the front of said case,

an escutcheon plate mounted in front of said door,

an axially fixed dial rotatably mounted in said plate,

said dial having an inwardly and forwardly sloping rim and a central recess,

a central hole in said dial aligned with said key hole,

an index mark on said plate,

and indicia on said rim to be brought into registry with said index mark as said dial is rotated.

4,683,739

KEY OPERATED LOCK

Donald R. Hughes, 2600 Brower, Simi Valley, Calif. 93065

Filed Jul. 21, 1986, Ser. No. 887,525

Int. Cl.[4] E05B *27/08*

U.S. Cl. 70—363 **12 Claims**

1. A key operated lock comprising:

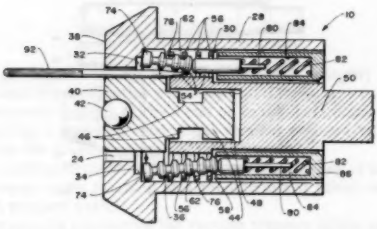
a housing;

a shaft connected to said housing and extending exteriorly therefrom, said shaft having a longitudinal center axis, said shaft being movable between a locking position and an unlocking position, said shaft being adapted to connect with a separate locking lever mechanism and movement of said shaft causes movement of the separate locking

lever mechanism between an unlocked position and a locked position;

means for fixing said shaft to said housing when said shaft is in said locking position, said means comprising a pin assembly, said pin assembly being movable within a range of movement relative to said housing in a direction parallel to said longitudinal center axis, with said pin assembly located in a particular position within said range of movement said shaft is located in said unlocking position;

a portion of said pin assembly being capable of being deflected laterally in a direction substantially transverse to said longitudinal center axis, whereby upon said pin assembly being moved by connection with a key the sad pin assembly moves in a direction only along said longitudinal center axis, whereby any attempt to pick said lock will cause said portion of said pin assembly to be deflected laterally preventing ascertaining of said particular position and movement of said shaft relative to said housing;



said pin assembly comprising a plurality of pin arrangements;

each said pin arrangement comprising an in-line set of a driver pin and a coding pin and a spring, each said driver pin being mounted within a driving pin receiving chamber, each said driving pin receiving chamber being fixed relative to said housing, each said driver pin to be continuously spring-biased by its respective said spring in an outward direction;

said portion of said pin arrangement that is capable of being deflected laterally comprising said coding pins; and

each said coding pin including a series of annular recesses, each said coding pin being slideably mounted within an opening formed within a section of said shaft, a plurality of gaps connecting with each said opening with there being formed a disc between each directly adjacent pair of said gaps, said lateral deflection occurs when a said disc slips into a said annular recess.

4,683,740

CYLINDER LOCK WITH KEY, INCORPORATING A PICKING PREVENTING MEANS

Deo Errani, Faenza, Italy, assignor to Costruzioni Italiane Serrature Affini C.I.S.A. S.p.A., Faenza RA, Italy

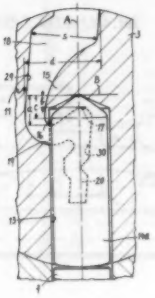
Filed May 24, 1985, Ser. No. 737,594

Claims priority, application Italy, Jun. 1, 1984, 3482 A/84

Int. Cl.⁴ E05B *15/06*

U.S. Cl. 70—419 **3 Claims**

1. A cylinder lock comprising a lock cylinder, a cylindrical seat formed in said lock cylinder, a plug rotatably mounted within said cylindrical seat, a first set of holes formed in said plug on a radial plane and including cylindrical portions, pins slidably disposed in said first set of holes and having conical ends, one of said holes and the pin accommodated therein having the same length, a key slot longitudinally formed in said plug for receiving a key and intersecting said first set of holes, said key having a shank including a back side portion and a notched portion, a second set of holes formed in said lock cylinder, tumbler pins slidably arranged within said second set of holes and cooperating with said pins, a longitudinal rib laterally projecting into said key slot and forming a rest for said pins, said longitudinal rib defining a zone of said key slot adapted for receiving said back side portion of the key and a zone adapted for receiving the notched portion of the key, wherein said rib defines a ridge having a top and forming a



groove, said ridge defining a portion of said key slot adjacent said top which connects said zones and intersects said cylindrical portions of said first set of holes and said groove having a bottom located substantially on said radial plane, through which said first set of holes penetrate into said rib.

4,683,741

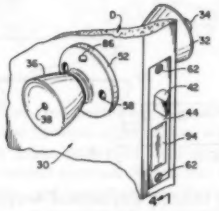
LIGHT SIGNAL FOR DOOR KNOB AND LOCK ASSEMBLY

Roy A. Fields, 51 Thompson St., Tuckahoe, N.Y. 10707

Filed Jul. 14, 1986, Ser. No. 885,420

Int. Cl.⁴ E05B *41/00*

U.S. Cl. 70—432 **2 Claims**



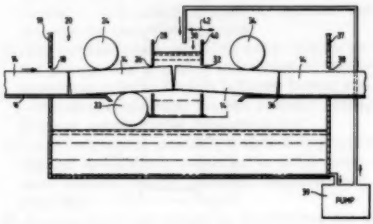
1. In a door knob and lock assembly for a bathroom door having one of a pair of knobs on the exterior and one on the interior of said bathroom door and a latching bolt operable by the rotation of the knobs, said one of the knobs on the interior of said bathroom door being provided with a turn button operable to selectively arrest the movement of the bolt to place the assembly in locked condition, the improvement comprising a battery operated electrical circuit for indicating only said locked condition of said assembly, said circuit including switch means operable by the turn button to activate a light emitting diode, said light emitting diode being mounted in conjunction with said one door knob on the exterior of said bathroom door so as to be visible from the exterior of the door.

4,683,742

COATING BILLETS FOR FORGING

Anthony C. Eveson, Reading, Great Britain, assignor to Radyne Limited, Wokingham, England

Filed Mar. 19, 1986, Ser. No. 841,295
Claims priority, application United Kingdom, Mar. 19, 1985, 8507093
Int. Cl.[4] B21J 3/00
U.S. Cl. 72—43 8 Claims



1. A method of heating and lubricating billets for forging comprising the steps of:

urging a line of billets end-to-end along a path towards a coating tank containing a lubricant and conveying the line of billets through the coating tank and thence to a forging station;

and modifying the direction of movement of the line of billets within the coating tank such that an angular separation is created between adjacent end faces of successive billets, whereby a better coating of the end faces is achieved;

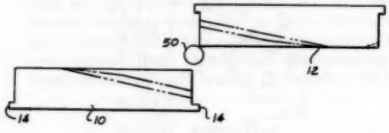
and heating the lubricated billets to the forging temperature prior to their transfer to the forging station.

4,683,743

APPARATUS AND METHOD FOR ROLL SIZING DIAMETERS

Paul Fitzpatrick, Holland, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.

Division of Ser. No. 356,986, Mar. 11, 1982, Pat. No. 4,488,418.
This application Aug. 31, 1984, Ser. No. 645,977
Int. Cl.[4] B21H 5/00
U.S. Cl. 72—88 2 Claims



1. A method for finishing a cylindrical workpiece, comprising:

(a) imparting by a turning operation a surface roughness to the workpiece greater than about 700 micro-inches and an oversize diameter, and

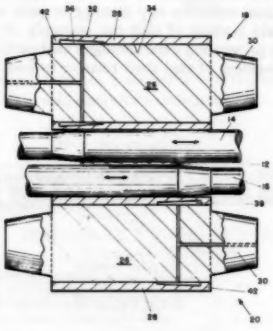
(b) cold rolling the turned workpiece while it is rotatably supported between and in engagement with a pair of spaced apart facing sliding tools configured to axially move workpiece material on the surface and compress workpiece material on the surface between substantially parallel flat finishing surfaces on the tools each of said finishing surfaces having a surface roughness not exceeding about 25 micro-inches to impart such surface roughness to the workpiece acceptable for bearing surfaces and a reduced diameter acceptable from a tolerance standpoint for subsequent tooth formation thereon, if desired, by said rolling without the need for an intermediate grinding operation on the workpiece after step (a).

4,683,744

FLEXIBLE EDGE ROLL

Vladimir B. Ginzburg, and Naum M. Kaplan, both of Pittsburgh, Pa., assignors to Wean United Rolling Mills, Inc. and International Rolling Mill Consultants, Inc., both of Pittsburgh, Pa.

Filed Jun. 18, 1985, Ser. No. 746,376
Int. Cl.[4] B21B 27/02, 31/32
U.S. Cl. 72—243 10 Claims



1. In a rolling mill stand for reducing a varying range product width, said product being a workpiece having two opposed longitudinal surfaces, a center, and two opposed longitudinal edges, said stand comprising:

at least two work rolls forming a roll gap to receive said workpiece for its said reduction, each said work roll arranged transversely of and having a working surface adapted to contact said workpiece along its width when said workpiece is in said gap for working a different one of said two opposed longitudinal surfaces thereof,

a backup roll associated with each said work roll remote from said roll gap, and each said backup roll having a surface along its length adapted to substantially contact said working surface of its associated work roll and having a rigid central portion and opposed ends,

at least one end of each backup roll arranged at opposed ends relative to each other having at least a partial generally annular chamber means formed adjacent the roll end portions of said contacting surface and coextensive with the associated edge of the workpiece when in said gap, said chamber means adapted to receive an adjustable amount of pressurized fluid when in an operative mode,

said each work roll having a gradual taper area axially outward of its working surface and being on the same end of the work roll that said chamber means of the associated backup rolls are located and adjacent its working surface, said taper area overlapping a portion of said associated chamber means and ending near the end of said contacting surface of its said associated backup roll,

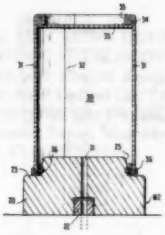
said chamber means being coextensive with the line of demarcation between the said taper area and the working surface of the work rolls and adjacent the ends of the workpiece being rolled when in said roll gap, whereby when in said operative mode said taper area and said pressurized fluid in said chamber means operate in a cooperative manner to produce a controlled pressure distribution near said opposed edges of said workpiece in said roll gap which is less in value than that along said pressure center of said workpiece applied by said rigid central portion of said backup roll such as to reduce over rolling of the edges of said workpiece.

4,683,745

CANNISTER SEAL INTEGRITY TESTER

John D. Broughman, Jr.; Barry G. Calvert, and Danny B. Hill, all of Covington, Va., assignors to Westvaco Corporation, New York, N.Y.

Filed Aug. 28, 1986, Ser. No. 901,201
Int. Cl.[4] G01M *3/26*
U.S. Cl. 73—49.2 **3 Claims**



1. A process for testing the fabrication seal integrity of unfilled containers comprising the steps of:

a. temporarily sealing an open end of an unfilled container;
b. drawing a predetermined initial vacuum pressure value within the internal volume of said container;
c. at a starting moment, isolating the internal volume of said container upon reaching said predetermined initial vacuum pressure value;
d. continuously monitoring the vacuum pressure within said isolated container volume over a predetermined total test time;
e. memory noting internal volume vacuum pressure values for said starting moment and for at least two successive later moments terminating substantially equal time intervals;
f. determining a first vacuum loss rate value for said internal volume from the first elapsed time interval and the differential between said starting moment and the first of said successive moment vacuum pressure values;
g. making a first comparison of said first vacuum loss rate to a first set-point value;
h. making a first decision to terminate or continue said test process on the basis of said first comparison;
i. when said process is continued, determining a second vacuum loss rate value from a second elapsed time interval and the vacuum pressure value differential over said second elapsed time interval;
j. making a second comparison of said second vacuum loss rate to a second set-point value that is distinctive from said first set-point value; and,
k. making a second decision to accept or reject said container on the basis of said second comparison.

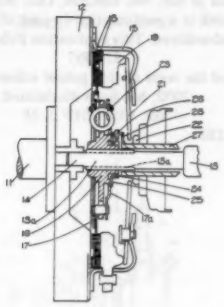
4,683,746

TORQUE MONITORING

Christopher V. Cullingford, Inkberrow; John S. Forrester, Halesowen, and Gerald B. Smith, Sheldon, all of United Kingdom, assignors to Lucas Electrical Electronics and Systems Limited, England

Filed Jan. 22, 1986, Ser. No. 821,392
Claims priority, application United Kingdom, Feb. 2, 1985, 8502695
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—118.1 **12 Claims**

1. A friction clutch assembly having a two part, rotatable, drive transmitting member, the two parts of said member being movable relative to one another against the action of damper spring means, the clutch further including a plurality of angularly spaced reference means on each of said parts of said two part member respectively, and, first and second sensor means relative to which said two part member rotates, each of said first and second sensor means monitoring said reference means and in use producing, at a plurality of points in each revolution of the two part member, respective outputs representative of the relative positions of said parts of said two part member,



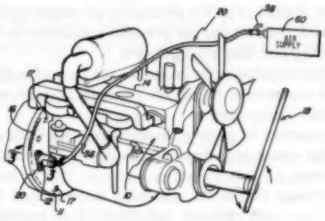
said second sensor means being angularly spaced about the axis of rotation of said member from said first sensor means so as to produce an output between successive outputs of the first sensor means.

4,683,747

TIMING DEVICE

James W. Hall, 9511 Merrick, Taylor, Mich. 48180

Filed Mar. 14, 1986, Ser. No. 839,555
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—119 R **26 Claims**



1. A timing device, for positioning a location pin into the location point on the flywheel of an engine, which comprises:

a pilot housing guide, said pilot housing guide having a cylindrical chamber disposed therein and an end portion;
a mounting plate, said mounting plate having an aperture located near it scenter through which said pilot housing guide is disposed and securing attached, said mounting palte also having a pair of apertures positioned at its opposite ends for receiving machine bolts which are screwed into the engine's block;
a location pin, said location pin being so disposed within the cylindrical chamber of said pilot housing guide so as to allow said location pin longitudinal displacement within the cylindrical chamber, the inside end of said location pin being nearer to said mounting plate then the end portion of said pilot housing guide;
means for longitudinally displacing said location pin within the cylindrical chamber of said pilot housing guide; and
means for turning on or off said longitudinal displacing means from the engine compartment.

4,683,748

METHOD AND APPARATUS FOR MEASURING DYNAMIC FLUID FLOW RATE

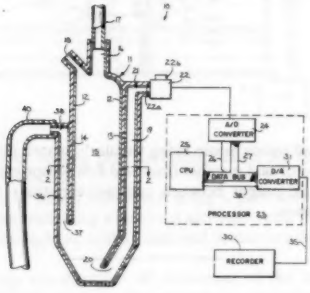
Garry L. Carter, Racine, Wis., assignor to Medical Engineering Corp., Racine, Wis.

Continuation of Ser. No. 666,358, Oct. 30, 1984, Pat. No. 4,589,280, which is a continuation-in-part of Ser. No. 447,759, Dec. 8, 1982, abandoned. This application Feb. 13, 1986, Ser. No. 829,597

The portion of the term of this patent subsequent to May 20, 2003, has been disclaimed.

Int. Cl.[4] G01F *3/38*

U.S. Cl. 73—226 3 Claims



1. An apparatus for providing a running indication of the dynamic flow rate of a bodily fluid by measuring the pressure exerted upon a column of air by the fluid as the fluid accumulates, comprising:

an air pressure transducer responsive to the air pressure of the column of air for producing an output signal representative thereof, said air pressure transducer having a measuring port and a gauge port;

a unitary container for receiving the flow of bodily fluid and for connection to the air pressure transducer, said container comprising:

a chamber to receive the accumulating bodily fluid;

inlet means for admitting the bodily fluid into the chamber;

drainage means for siphoning accumulated bodily fluid from said chamber when said fluid reaches an upper level;

a sealed substantially vertical measurement conduit for enclosing the column of air, said conduit sharing a wall in common with the chamber and being in communication with the chamber through an opening in the common wall at the base of the conduit;

air pressure outlet means for providing sealed communication between the measuring port of the air pressure transducer and the measurement conduit above the upper level; and

chamber pressure outlet means for providing communications between the gauge port of the air pressure transducer and the interior of the chamber above the upper level;

wherein a dynamic flow rate of a bodily fluid into the chamber provides a corresponding dynamic air pressure at the air pressure outlet means to which the air pressure transducer is responsive; and

processor means for converting the air pressure transducer output signal into a running indication of the instantaneous flow rate of the bodily fluid as the chamber fills to the upper level.

4,683,749

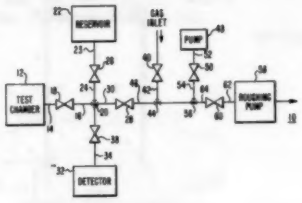
PROCESS AND SYSTEM FOR DETECTING AND MEASURING A TRITIUM GAS LEAK

Norman C. Thurlow, Horseheads, N.Y., and Robert M. Hruda, Bradenton, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 22, 1986, Ser. No. 866,182

Int. Cl.[4] G01M *3/20*

U.S. Cl. 73—40.7 10 Claims



1. A method for detecting and measuring a tritium gas leak from a sealed container comprising, disposing a sealed container of tritium gas in a chamber, collecting and concentrating a sample of gas from said chamber in a reservoir and passing said sample into at least one radiation detector.

4,683,750

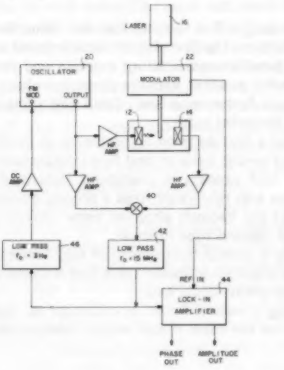
THERMAL ACOUSTIC PROBE

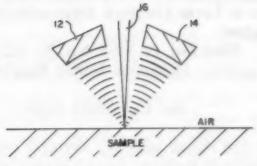
Gordon S. Kino, Stanford; Richard G. Stearns, Mountain View, and Butrus T. Khuri-Yakub, Palo Alto, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Nov. 7, 1984, Ser. No. 669,197

Int. Cl.[4] G01N *29/00*

U.S. Cl. 73—606 12 Claims





1. A method of measuring surface effects of a substrate comprising propagating an acoustic wave in a medium over the surface of the substrate, heating said substrate by impinging

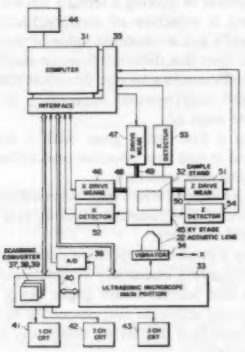
a modulated incident beam of radiation on the substrate, measuring the change in phase of the propagated wave in response to this impinging beam of radiation and resulting heating of the substrate as it affects said medium to measure the surface temperature of the substrate.

4,683,751

SAMPLE STAND ADJUSTING DEVICE IN AN ULTRASONIC MICROSCOPE

Shinichi Imade, Hachioji, and Kouichi Karaki, Hino, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 12, 1986, Ser. No. 861,802
Claims priority, application Japan, May 14, 1985, 60-102041
Int. Cl.[4] G01N *29/04*
U.S. Cl. 73—606 **3 Claims**



1. An ultrasonic microscope sample stand adjusting device comprising:

an ultrasonic beam transmitting and receiving means having an acoustic lens, for transmitting an ultrasonic wave as a beam through said acoustic lens and for outputting the ultrasonic wave received by said acoustic lens as an electric signal for displaying a picture image by scanning on a sample surface;

a sample table means disposed opposite said ultrasonic beam generating means to support a sample mounted thereon;

a sample stand driving means for moving either one of said sample table means and said acoustic lens relative to one another in X, Y and Z-directions;

a three-dimensional measuring and memory means, at three positions to determine the sample surface plane for scanning, as distance Zo in the Z direction which distance coincides with the focal distance of said acoustic lens at a first position **0**, displacement Za−Zo in the Z direction which is defocus value at a second position A, displaced Xa from the first position **0**, in the X direction and displacement Zb−Zo in the Z direction which is another defocus value at a third position B, displaced Yb from the first position **0** in the Y direction;

a computing means for computing the inclination of said sample plane with respect to the X-Y plane for scanning on the basis of the scalars Zo, Za−Zo, Zb−Zo, Xa and Yb of said distances memorized by said distance measuring and memory means; and

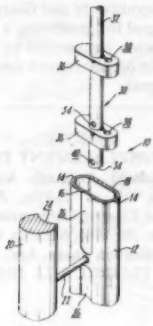
a table inclination means for making said sample surface plane coincide or become parallel with the scanned plane in conformity with the operation data from the computing means.

4,683,752

ULTRASONIC PROBE

Leslie Bradshaw, Abingdon, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Jul. 1, 1985, Ser. No. 750,471
Claims priority, application United Kingdom, Jul. 4, 1984, 8417028
Int. Cl.[4] G01N *29/00*
U.S. Cl. 73—642 **8 Claims**



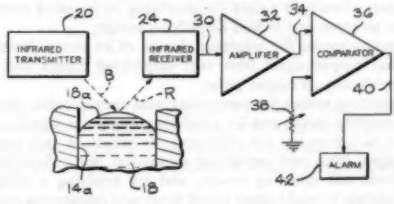
1. An ultrasonic probe for determining a property of a liquid, the probe comprising a tube closed at one end, an ultrasonic transducer assembly within the tube, traversable along at least a portion of the length of the tube and arranged to transmit a beam of ultrasound through part of the wall of the tube, and a reflector extending parallel to the tube along the said portion of the tube, spaced apart from the tube so as to define between the tube and the reflector a gap, so that in use the gap is occupied by the liquid and the ultrasound propagates across the gap and is reflected back to the tube by the reflector, the part of the wall through which the ultrasound propagates being plano-concave in transverse section, with a plane surface on the inside surface of the tube and a cylindrically-concave surface on the outside surface of the tube, so as to focus the ultrasound in the gap.

4,683,753

VIBRATION DETECTOR

Christopher P. Nelsen, Laurinburg, and Robert L. Melton, Sanford, both of N.C., assignors to Dana Corporation, Toledo, Ohio

Filed Oct. 18, 1985, Ser. No. 789,138
Int. Cl.[4] G01N *29/00*
U.S. Cl. 73—655 **11 Claims**



1. A device for sensing vibration and motion of an object, said device comprising:

means secured to the object for containing a fluid mass having an upwardly facing reflective surface;

means for directing a beam of light toward the upper surface of the fluid mass to cause at least a portion of the beam to be reflected therefrom;

means for receiving a reflected portion of the beam, said

receiving means being responsive to the reflected portion for generating an output signal representing a characteristic of the reflected portion, such that vibration of the fluid mass produces disturbances in the upper surface thereof, thus causing the output signal of the receiving means to vary as the fluid mass is vibrated;

filter means for filtering a portion of the output signal to generate a filtered output signal representing a predetermined range of frequencies of vibration of said fluid mass;

reference means for generating a reference signal representing a predetermined amount of vibration;

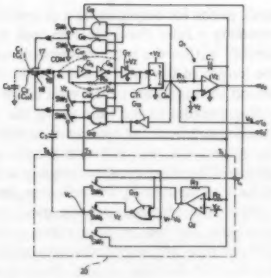
threshold means responsive to said flitered output signal and said reference signal for generating a trigger signal when the level of vibration represented by said filtered output signal exceeds said predetermined amount represented by said reference signal.

4,683,754

CAPACITIVE DISPLACEMENT TRANSDUCER

Terutaka Hirata; Tadashi Azegami; Atsushi Kimura, and Megumi Katayama, all of Tokyo, Japan, assignors to Yokogawa Hokushin Electric Corporation, Tokyo, Japan

Filed Apr. 29, 1986, Ser. No. 857,045
Claims priority, application Japan, Apr. 30, 1985, 60-92889
Int. Cl.[4] G01L *9/12, 19/04*
U.S. Cl. 73—708 **13 Claims**



1. A capacitive displacement transducer comprising

a first capacitor and a second capacitor formed of a first electrode, a second electrode, and a movable electrode, said first electrode and said second electrode being disposed opposite to said movable electrode, and having capacitances which change differentially in response to physical displacement to be detected changing the position of said movable electrode with respect to said first and second electrodes;

amplifying means for detecting the potential of said movable electrode and for generating an output signal;

negative feedback means for supplying an inverted current to an input end of said amplifying means;

counting means for counting change of an output level of said output signal from said amplifying means and for producing an output pulse;

integrating means for integrating said output pulse of said counting means and for producing an output signal;

first switch means for switching, by means of said output signal from said amplifying means and said output pulse from said counting means, and for applying a voltage relating to said output signal from said integrating means and a reference voltage, to said first capacitor;

second switch means for switching, by means of said output signal from said amplifying means and said output pulse from said counting means, and for applying said voltage relating to said output signal from said integrating means and a source voltage to said second capacitor; and

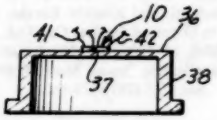
fixed capacitance correcting means for applying a voltage relating to difference between said source voltage and said voltage relating to said output signal from said integrating means to said movable electrode through a fixed impedance.

4,683,755

BIAXIAL STRAIN GAGE SYSTEMS

Norbert E. Samek, Sierra Madre, Calif., assignor to IMO Delaval Inc., Lawrenceville, N.J.

Filed Nov. 15, 1985, Ser. No. 798,476
Int. Cl.[4] G01L *7/08*
U.S. Cl. 73—727 **22 Claims**



1. In a method of making a sensing device, including the step of providing a substrate of semiconductor material having cubic unit cells and an absolute value of piezoresistive coefficient in a first direction different from an absolute value of piezoresistive coefficient in a second direction transverse to said first direction, the improvement comprising in combination with said step the steps of:

providing a first strain gage with a dominant dimension oriented in said first direction and diffusing said first strain gage into said substrate;

providing a second strain gage with a dominant dimension in said second direction and diffusing said second strain gage into said substrate;

providing a pressure responsive diaphragm having a central area displaying essentially symmetrical biaxial strains;

said first and second strain gages being located within an area of said substrate corresponding to said central area of said diaphragm displaying essentially symmetrical biaxial strains; and

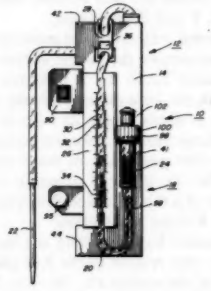
attaching said substrate in said area to the diaphragm at an orientation exposing said gages to said biaxial strains.

4,683,756

LOW COST MANOMETER

James L. Derleth, Rochester, and Michael A. Ciminelli, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 24, 1986, Ser. No. 822,177
Int. Cl.[4] G01L *7/18, 19/14*
U.S. Cl. 73—747 **5 Claims**



1. A manometer assembly for measuring air pressure comprising, in combination:

a housing assembly including a first panel in pivoting engagement with a second panel, said panels forming an enclosed chamber when in the closed position, said first

panel having formed integrally thereon a slotted gauge member and a slideway; and

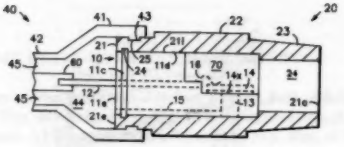
a pressure measuring assembly including a reservoir slidably mounted along said slideway, said reservoir adapted to contain a fluid therein, a flexible tube connected at one end to said reservoir and at the other end to a probe, said tube seated in said gauge member slot, and a push-pull cap assembly secured to said reservoir, said cap assembly controlling communication between the reservoir interior and the ambient.

4,683,757

AXIAL PRESSURE SENSOR

Victor J. Adams, and Brooks L. Schofield, Jr., both of Tempe, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 24, 1986, Ser. No. 843,433
Int. Cl.[4] G01L *7/08, 9/08, 19/14*
U.S. Cl. 73—756 **13 Claims**



1. An axially arranged pressure sensor assembly comprising:

a dielectric body member having an exterior surface including a platform for supporting a solid state sensor element wherein said platform is parallel to an axis of said body member and wherein said body member is substantially cylindrical and said axis corresponds to the longitudinal axis of said cylinder;

conductive leads in said body member with first portions protruding from a first end of said body member transverse to said platform, for making external electrical connections to said sensor assembly, and second ends exposed at a second portion of said body member opposite said first end, for accepting connections from said sensor element;

reference pressure inlet means in said body member, running between a first opening in said platform at the location of said sensor element, and a second opening in said first end; and

barrel means having a first axially open end for coupling to a source of pressure to be measured, a second axially open end opposite said first end, and a cavity extending between said first and second ends, wherein said body portion is sealably located in a first part of said cavity adjacent said second end of said barrel means and with said first end of said body portion oriented toward said second end of said barrel means, and wherein a second part of said cavity surrounds said platform and communicates with said first end of said barrel means.

4,683,758

DEVICE FOR MEASURING STRESSES IN VACUUM DEPOSITION COATINGS

David W. Hoffman, Ann Arbor, and Cassimer M. Kukla, Taylor, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 16, 1986, Ser. No. 819,444
Int. Cl.[4] G01N *3/00*
U.S. Cl. 73—780 **8 Claims**

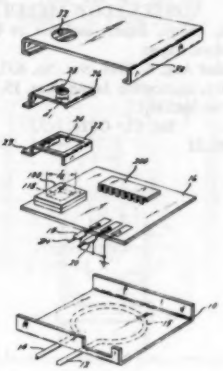
1. A sensor for measuring stresses present in deposited coatings of materials emitted from a vapor source comprising:

first means defining a relatively rigid electrical conductor having a planar surface;

second means defining a relatively flexible electrical conductor having a first generally planar surface opposing said first means across an evacuated space and a second generally planar surface for receiving said vapor deposition coatings;

third means providing rigid support of said first and second means;

said second and third means define the boundaries of an uninterrupted common area of separation between the electrical conductors defined by said opposing first and second means; and



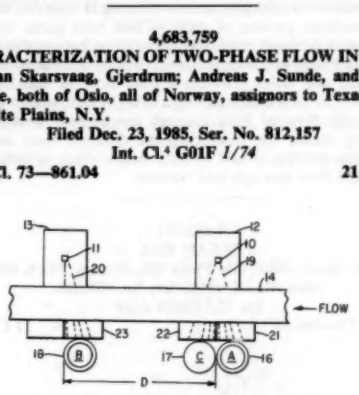
mask means disposed adjacent said second planar surface of said second means to limit the vapor deposited material being coated on said second planar surface by said vapor source to an area that is within the defined boundaries of the uninterrupted common area of separation between the electrical conductors defined by said first and second means.

4,683,759

CHARACTERIZATION OF TWO-PHASE FLOW IN PIPES

Kristian Skarsvaag, Gjerdrum; Andreas J. Sunde, and Sverre Thue, both of Oslo, all of Norway, assignors to Texaco Inc., White Plains, N.Y.

Filed Dec. 23, 1985, Ser. No. 812,157
Int. Cl.[4] G01F *1/74*
U.S. Cl. 73—861.04 **21 Claims**



19. A method for deriving the flow rates of the gas and liquid components in a gas-liquid mixture flowing within a pipe having a known cross-sectional area, wherein said gas occurs as a series of bubbles within said liquid, which comprises the steps of:

making repeated void fraction measurements within a unit flow cell of said mixture,

obtaining from said void fraction measurements the profile of a gas bubble in said unit flow cell,

deriving from said obtained profile the average cross-sectional void fraction of said unit flow cell,

measuring the speed of propagation of said profile through said pipe,

deriving the flow rate of the gas component in said mixture from said measured speed of propagation of said profile, said derived average cross-sectional void fraction, and said known pipe cross-sectional area, and

deriving the flow rate of the liquid component in said mixture from said derived flow rate of said gas component, said measured speed of propagation of said profile, and said known pipe cross-sectional area.

4,683,760

VORTEX FLOW METER

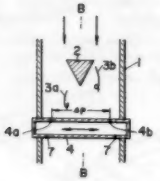
Masao Misumi, Tokyo, Japan, assignor to Oval Engineering Co., Ltd., Tokyo, Japan

Filed Aug. 6, 1984, Ser. No. 637,924

Claims priority, application Japan, Aug. 15, 1983, 58-148928; Dec. 27, 1983, 58-204538[U]

Int. Cl.[4] G01F *1/32*

U.S. Cl. 73—861.22 **11 Claims**



1. A vortex flow meter for measuring fluid flow in a conduit comprising a vortex generator disposed transversely in said conduit, a tube member in said conduit disposed downstream of said vortex generator within the stream of vortices, said tube member extending transversely of said conduit and transversely of said vortex generator, a partition wall means in said tube member which divides the tube member into a first tube part and a second tube part, means defining at least one hole in an intermediate portion of each of said tube parts, by-pass means external of said conduit and extending between said first and second tube parts such that the effect of said partition wall means and said holes provides a fluid flow in said by-pass means, said by-pass means having a straight line portion which smooths the flow of fluid through the by-pass means, and measuring means for measuring the flow of fluid in said straight line portion of said by-pass means which is indicative of the fluid flow through said conduit.

4,683,761

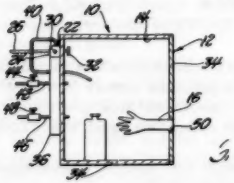
CLEAN BOX

James H. Stock, 30805 Old Plank Rd., Wixom, Mich. 48096

Filed May 1, 1986, Ser. No. 858,018

Int. Cl.[4] G01N *1/14*

U.S. Cl. 73—864.34 **17 Claims**



1. A portable sampling assembly (**10**) for connection to a ground water pump to collect and test ground water samples, said assembly comprising; a container (**12**) defining a chamber (**14**) for containing a controlled gaseous medium, handling means to manipulate items within said chamber (**14**) and preventing contamination of the gaseous medium within said chamber (**14**) by contaminates from the exterior thereof, a gas inlet (**18**) and a gas outlet (**20**) through said container (**12**) for regulating the flow of the gaseous medium into and out of said chamber (**14**), said assembly (**10**) characterized by including valve means (**22**) having a first position for bypassing a sample of water from the pump away from said chamber (**14**) to ensure that a collected sample is free of pumping system contaminates and a second position allowing for continuous flow of the sample of water into said chamber (**14**).

4,683,762

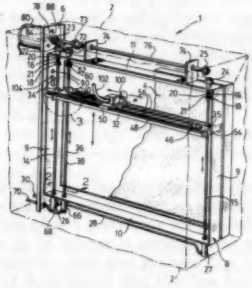
CONTAINMENT SYSTEM

John P. Aurich, 18 Scarborough Heights Blvd., Scarborough, Ontario, Canada M1M 2V4

Filed Jul. 10, 1985, Ser. No. 753,512

Int. Cl.[4] G01N *1/26*

U.S. Cl. 73—863.58 **26 Claims**



1. An apparatus, suitable for use in monitoring the constituents of a fluid flow, the apparatus comprising: a platform means adapted for spanning a duct; a first drive shaft for driving the platform means across the duct; a carriage means slidably mounted on the platform means and adapted to carry a sampling probe; a second drive shaft for driving the carriage means along the platform means, whilst permitting movement of the platform means when driven by the first drive shaft; drive means arranged for mounting outside the duct and for driving the first and second drive shafts; and a fluid seal means, providing a fluid seal for the drive means, to prevent communication between the interior and exterior of the duct.

4,683,763

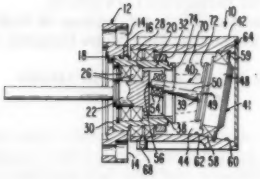
ROTARY MOTION FEED-THROUGH APPARATUS

Valentin Balter, Cupertino, Calif., assignor to Huntington Mechanical Laboratories, Inc., Mt. View, Calif.

Filed May 20, 1986, Ser. No. 865,233

Int. Cl.[4] F16J *15/50*

U.S. Cl. 74—18.1 **7 Claims**



1. A rotary feed-through mechanism comprising:

a driven shaft having a central axis;

means coupled with the driven shaft for mounting the driven shaft for rotation about the central axis of the driven shaft;

a driver member spaced from the driven shaft and having a first part and a second part, the first part having an outer periphery surrounding the central axis of the driven shaft;

means having a cylindrical inner surface surrounding the first part of the driver member for rotating about the driver member, the central axis of the inner surface being transverse to and intersecting the central axis of the driven shaft;

means coupling the outer periphery of the first part of the driver member with said inner surface to cause wobbling of the driver member about the point of intersection of the central axis of said driven shaft and said inner surface in response to the rotation of said rotating means about the central axes thereof; and

means coupled to said driven shaft and responsive to the wobbling action of the second part of said driven member for rotating the driven shaft about said central axis thereof relative to said mounting means.

4,683,764

PUMP DRIVE FOR DEEP WELL PUMPING INSTALLATIONS

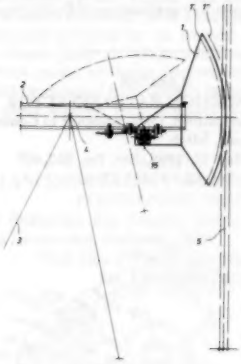
Johannn Neuhauser, and Hans-Joachim Brauch, both of Salzgitter, Fed. Rep. of Germany, assignors to Salzgitter Maschinen und Anlagen Aktiengesellschaft, Salzgitter, Fed. Rep. of Germany

Filed Jan. 22, 1985, Ser. No. 693,804

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1984, 3401850

Int. Cl.[4] F04B *47/02*

U.S. Cl. 74—41 **8 Claims**



8. A pump drive for a deep well pumping installation, including a stand, a rocking beam supported for rocking movement about a substantially horizontal axis on the stand, and a horse-head shaped transmission part engageable with a pumping rod in the well, the horse-head transmission part being pivotally supported on the rocking beam about a pivot axis which extends substantially transversely to the longitudinal axis of the rocking beam to allow tilting movement of the transmission part in the direction of the stand, said horse-head transmission part comprising two force application points spaced apart one from the other and from a center of gravity of the transmission part, the force application points being arranged relative to said center of gravity and to said pivot axis such that during the tilting movement of the horse-head transmission part in either direction a force application point being used always goes past its top dead center point, and the center of gravity precedes the force application point being used in going past their respective top dead center points, and said application points including hooked eyelets for attaching a pulling rope to lateral sides of the horse-head transmission part.

4,683,765

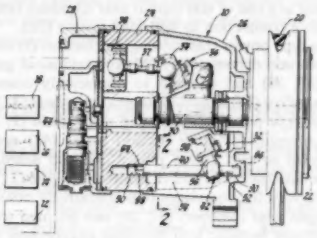
VARIABLE DISPLACEMENT WOBBLE PLATE COMPRESSOR GUIDE ROD MOUNTING ARRANGEMENT

Gary T. Miller, E. Amherst, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 7, 1986, Ser. No. 882,789

Int. Cl.[4] F04B *1/28*; F16H *23/04*

U.S. Cl. 74—60 **2 Claims**



1. In a variable displacement wobble plate compressor having a guide rod that is mounted at opposite ends thereof in the compressor and operates through a multiple axis joint to prevent rotation while permitting angulation of a wobble plate, the improvement comprising vibration isolation mounting means formed of a vibration dampening material for mounting the opposite ends of the guide rod in the compressor.

4,683,766

TRANSMISSION FOR SELF-PROPELLED WORKING VEHICLES

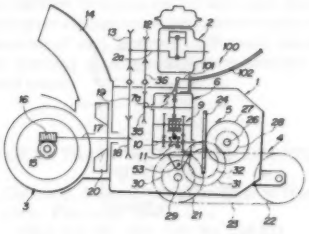
Sakichi Hatakeyama, and Hiroshi Takahashi, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 17, 1985, Ser. No. 755,870

Claims priority, application Japan, Jul. 25, 1984, 59-154242

Int. Cl.[4] F16H *3/08*

U.S. Cl. 74—333 **8 Claims**



1. A transmission for a self-propelled working vehicle (**100**) including:

an engine (**2**) having a drive pulley (**12**) operatively connected thereto; and

a load source (**21**) adapted to be driven with drive power from said engine (**2**),

in which said transmission (**6**) is interposed between said engine (**2**) and said load source (**21**) and adapted to transmit the drive power to said load source (**21**) while shifting same into one of a set of at least two speed modes, comprising:

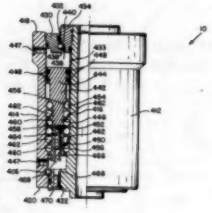
a driven pulley (35);
a drive belt stretched between said drive pulley (12) and said driven pulley (35);
a set of at least two input gear members (37, 38) operatively connected to said driven pulley (35) to have the drive power transmitted thereto from said engine (2) via said drive pulley (12) and said drive belt (36);
an input shaft (8) fitted with said input gear members (37, 38);
a set of at least two output gear members (48, 49) each respectively meshed with one of said input gear members (37, 38);
an output shaft (10) fitted with said output gear members (48, 49) and operatively connected to said load source (21);
a changeover mechanism (52, 11 48*a*, 49*a*) for selectively bringing any one of said output gear members (48, 49) into operative connection to said load source (21);
a friction type power transmitting mechanism (9) interposed between said driven pulley (35) and said input gear members (37, 38) and adapted to operatively connect said driven pulley (35) to said input gear members (37, 38), said friction type power transmitting mechanism (9) comprising a plurality of drive friction plates (41) operatively connected to said driven pulley (35) and adapted to be driven with the drive power from said engine (2), a plurality of driven friction plates (40) operatively connected to said input gear members (37, 38) and adapted to be each respectively brought into frictional engagement with one of said drive friction plates (41), and pressure exerting means (42) for exerting pressure to bring said drive friction plates (41) and said driven friction plates (42) into frictional engagement therebetween; and
a drive gear member (7, 7*b*) interposed between said driven pulley (35) and said drive friction plates (41) of said friction type power transmitting mechanism (9) and adapted to transmit the drive power from said engine (2) to said drive friction plates (41);
whereby large variations in load and torque imposed on said transmission can be absorbed while said vehicle is traveling or working.

4,683,767

ROTARY ACTUATOR WITH BACKLASH ELMINATION

Paul P. Weyer, 1462 Blake St., Enumclaw, Wash. 98022

Continuation-in-part of Ser. No. 575,228, Jan. 30, 1984, Pat. No. 4,590,816, and Ser. No. 662,256, Oct. 17, 1984. This application Jan. 17, 1985, Ser. No. 692,293
Int. Cl.[4] F16H *55/18*; F01B *3/00*
U.S. Cl. 74—409 **29 Claims**



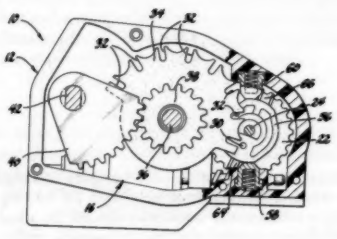
1. A fluid-powered actuator, comprising:
a body;
a rotatable member supported for rotation relative to said body and connectable to an external device;
a first member reciprocally mounted within said body;
a second member reciprocally mounted within said body coaxial with said first member, said first and second members being independently and adjustably rotatable and axially movable within at least a limited range relative to the other;
at least one piston reciprocally mounted within said body for application of fluid pressure to one or the other opposing sides thereof to produce axial movement of said piston, said piston operatively engaging at least one or the other of said first and second members to axially move said members in response to axial movement of said piston;
first torque-transmitting means for transmitting torque between said first member and said body;
second torque-transmitting means for transmitting torque between said first member and said rotatable member;
third torque-transmitting means for transmitting torque between said second member and said rotatable member;
fourth torque-transmitting means for transmitting torque between said second member and said body, at least said first and fourth torque-transmitting means or said second and third torque-transmitting means producing relative rotational movement between said body and said rotatable member in response to axial movement of said piston, and said first, second, third and fourth torque-transmitting means producing movement of said first and second members in unison and in the same axial direction with substantially equal axial travel in response to axial movement of said piston during fluid powered operation; and
adjustment means for selectively and adjustably moving said first member in one or the other of a rotational or axial direction relative to said second member within said limited range by an amount sufficient to axially preload said first and second members equally with respect to said first, second, third and fourth torque-transmitting means with a desired force, and for maintaining axial preloading of said first and second members during fluid powered operation once so adjusted for equalized preloading to substantially eliminate backlash in said first, second, third and fourth torque-transmitting means as said piston moves from one axial direction to the other to produce relative rotational movement between said body and said rotatable member in response to selective application of fluid pressure to said piston.

4,683,768

TRANSMISSION RATIO SELECTOR

John A. Budinski, Jamestown, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 12, 1986, Ser. No. 862,467
Int. Cl.[4] F16H *57/10*
U.S. Cl. 74—411.5 **3 Claims**



1. A transmission selector actuator for setting a transmission selector shaft to a desired transmission selector position chosen from a plurality of positions including Park, Reverse, Neutral and Drive, said actuator comprising: a housing; an electric motor; a worm driven by said motor; a worm wheel driven by said worm including a drive pin secured thereto and extending axially therefrom; a Geneva sector having a plurality of radial drive slots disposed thereon which are alignable with said drive pin to be engaged and driven thereby; a gear member integral and coaxial with said Geneva sector; a transmission selector assembly including a shaft and toothed segment which meshes with said gear member for rotation thereby to rotatably

position said shaft to a plurality of transmission selected positions; brake means for selectively stopping said worm wheel and electrical switch means operatively connected with said Geneva sector and said electric motor to selectively start and stop said electric motor at the desired transmission selector positon, said switch means being spaced to signal for motor stoppage and for brake selection when said drive pin is disengaged from said drive slots.

4,683,769

RACK GUIDE IN RACK-AND-PINION TYPE STEERING GEAR

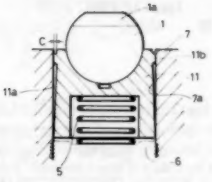
Hiroyuki Mochizuki; Nobuo Kobayashi; Yutaka Inuzuka; Shigeo Aiba, and Setsuo Nishi, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Jul. 16, 1985, Ser. No. 755,469

Claims priority, application Japan, Jul. 20, 1984, 59-110591[U]

Int. Cl.[4] B62D *3/12*

U.S. Cl. 74—422 **2 Claims**



1. A synthetic resin rack guide in a rack-and-pinion type steering gear comprising an arcuate projection formed on an outer peripheral surface of said rack guide at an end portion thereof which is in contact with a rack bar, wherein said arcuate projection projects by an amount corresponding to an amount of rack guide shrinkage which occurs after demolding of said rack guide, so that a diameter of said projection after said shrinkage is equal to or slightly larger than an inner diameter of a guide hole for receiving said rack guide.

4,683,770

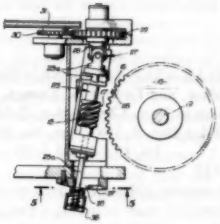
BALANCING GEAR APPARATUS FOR REMOTE POSITIONING DEVICE

Ernst F. Nettmann, Los Angeles, Calif., assignor to Matthews Studio Electronics, Burbank, Calif.

Filed Jun. 27, 1985, Ser. No. 749,283

Int. Cl.[4] F16H *1/16*

U.S. Cl. 74—425 **1 Claim**



1. A balancing gear apparatus for use with a remote camera positioning device including a rotary power source comprising:

(a) a main drive gear for transmitting rotary power to the camera in a given plane of rotation;

(b) a disengageable gear assembly comprising:

(i) a rotary gear coupled to the rotary power source;

(ii) a cylindrical worm gear having first and second ends, said worm gear including spiral gear threads about the circumference thereof for cooperative engagement with the main drive gear;

(iii) a first cylindrical shaft having first and second ends, the first end thereof being coupled to the rotary gear;

(iv) a second cylindrical shaft being axially aligned and in end abutment with the second end of said worm gear;

(v) a universal joint being coupled intermediate the second end of said first cylindrical shaft and the first end of said worm gear whereby the axis of said worm gear and said second cylindrical shaft can be angularly deflected with respect to the axis of said first shaft; and

(c) guide means for defining the deflection of said second cylindrical shaft, said guide means including a channel having first and second positions aligned with the plane of said main drive gear, said second cylindrical shaft being disposed within said channel.

4,683,771

GEAR-TEETH PROTECTOR IN CHANGE-SPEED GEARING UNITS

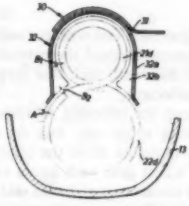
Yoshitaka Sogo; Masami Fukushima, and Tetsuro Kuzuya, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 31, 1981, Ser. No. 249,491

Claims priority, application Japan, Aug. 20, 1980, 55-117920[U]

Int. Cl.[4] F16H *57/04*

U.S. Cl. 74—467 **4 Claims**



1. A gear-teeth protector for a change-speed gearing unit in which a pair of meshingly engaged upper and lower, changed-speed, toothed gears of high meshing rate are arranged adjacent to an upright wall in a housing for said gearing unit, said gear-teeth protector comprising a U-shaped shroud member secured to one face of said upright wall for preventing metallic alien particles being trapped between said change-speed gears, said shroud member forming a pair of side walls enclosing the teeth on said upper change-speed gear and extending below the meshing portion of said lower change-speed speed gear to enclose the meshing engagement portion between said two change-speed gears.

4,683,772

HAND GEAR TRAIN WITH THREE DEGREES OF FREEDOM

Thomas A. Colimitra, Monroe, Conn., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 25, 1985, Ser. No. 758,931

Int. Cl.[4] B25J *17/02*

U.S. Cl. 74—479 **4 Claims**

1. A remotely operated hand gear train for the orientation of an end effector mounted at one end thereof comprising:

an external housing adapted to be mounted onto a robot arm, said housing defining a first axis A_1;

a first housing rotatably mounted within said external housing for rotation about said first axis A_1, said first housing defining therein a second axis A_2 which is substantially perpendicular to said axis A_1;

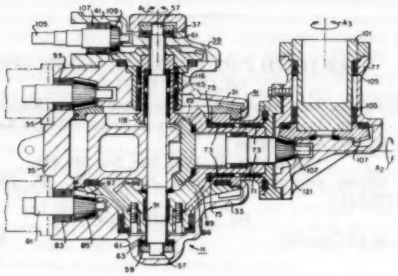
a second housing rotatably mounted in said first housing for rotation about axis A_2, said second housing defining

therein an axis A_3 which is normal to axis A_2 and radially spaced from axis A_1;

a third housing rotatably mounted in said second housing for rotation about axis A_3, said third housing having a gear rack circumferentially disposed about the end thereof;

a first drive system for effecting the rotation of said first housing about said axis A_1 comprising gear means disposed about said first housing and gear drive means engaged therewith;

a second drive system for effecting rotational movement of said second housing about said axis A_2 comprising first gear means with a first gear rack and a second gear rack concentrically disposed about one end of said axis A_1 within said external housing, gear drive means engaged



with said first gear rack and wherein said second housing includes gear means disposed thereabout and said second rack is engaged therewith such that rotation of said gear drive means is effected;

a third drive system for effecting rotational movement of said third housing about said axis A_3 comprising gear means rotatably mounted about the other end of said axis A_1 and having a first gear rack and a second gear rack, third gear drive means engaged with said first gear rack, a drive shaft having a first gear rack at one end and a second gear rack at the other end rotatably mounted within said second housing about said axis A_2, said gear means second rack being engaged with said drive shaft first gear rack and said drive shaft second gear rack being engaged with said third housing gear rack.

4,683,773

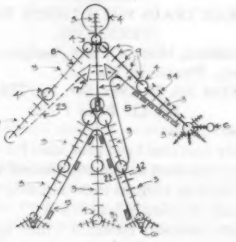
ROBOTIC DEVICE

Gary Diamond, 671 Landfair, #9, Los Angeles, Calif. 90024

Filed Jun. 27, 1985, Ser. No. 749,424

Int. Cl.[4] G05G *11/00;* **B25J** *1/02, 9/12*

U.S. Cl. 74—479 **7 Claims**



1. A robotic device formed of at least one cable trussed compression member the device comprising,

at least one continuous non-segmented flexible mast,

said at least one mast being joined to a base,

at least three substantially planar bulkheads, attached to said mast at spaced intervals thereby not in contact,

at least three radially arranged cable groups passing through holes in said bulkhead each group having at least one cable end terminating along a radial in each of said at least three bulkheads thereby comprising at least nine cables,

said cable groups having their remaining ends terminated in a lengthening and shortening control means,

a means to coordinate said control means,

a weighted means being movable along the length of said mast, thereby changing the center of gravity of said device,

a means to control said weighted means.

4,683,774

BOWDEN CABLE

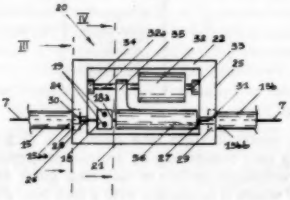
Serafino Memmola, Varese, Italy, assignor to Delta Elettronica s.r.l., Varese, Italy

Filed Feb. 8, 1985, Ser. No. 699,787

Claims priority, application Italy, Mar. 8, 1984, 83609 A/84; Oct. 25, 1984, 60968/84[U]; Oct. 31, 1984, 60978/84[U]

Int. Cl.[4] F16C *1/10*

U.S. Cl. 74—501 R **10 Claims**



1. A motion transmitting device, particularly for use in motor vehicles, comprising an elongated tubular casing having fixed first and second end portions, said casing including spaced apart first and second tubular sections having fixed lengths and respectively including said first and second end portions, and a rigid insert between said sections, said sections including terminal portions remote from the respective end portions and said insert having sockets for the terminal portions of said sections; an axially movable wire extending into said casing and beyond at least one of said fixed end portions; locking means disposed in said insert and being pivotable therein relative to said casing into and from at least indirect engagement with said wire to hold the wire against axial movement relative to the casing; and means for moving said locking means relative to said casing, said moving means including motor means and control means for said motor means.

4,683,775

DIFFERENTIAL AXLE SPEED SENSING MECHANISM

Gregory J. Hilker, and Edward A. Tieman, both of Ft. Wayne, Ind., assignors to Dana Corporation, Toledo, Ohio

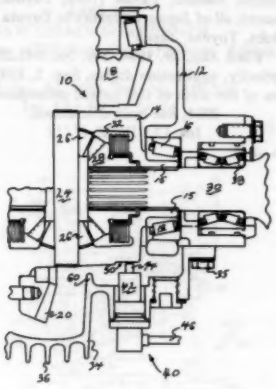
Filed Dec. 9, 1985, Ser. No. 806,306

Int. Cl.[4] F16H *1/38*

U.S. Cl. 74—710 **12 Claims**

1. A speed sensing differential axle mechanism including a carrier, a differential case including a pair of opposed support trunnions, said case rotatably supported in said carrier by said pair of opposed trunnions, said case further including a body portion positioned intermediately of said trunnions, said body portion disposed for containing a differential gear set including a cross shaft supporting a pair of differential pinions, and a pair of side gears in mesh with said pinions, said body portion including a ring gear flange at a first end adjacent to but axially inwardly of one of said trunnions, and a small diameter end portion opposed to said first end and adjacent the other of said trunnions and positioned intermediately of said other trunnion

and one of said side gears, said body portion having a diameter greater than that of either of said trunnions, said small diameter end portion comprising a plurality of spaced teeth, said teeth



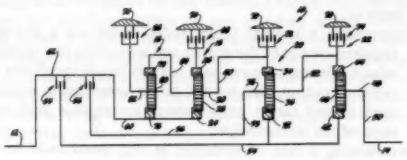
being integral to and formed as one part of said case and spaced uniformly thereabout, an electronic pickup element secured rigidly to said carrier and disposed for spaced registration with respect to said small diameter end portion of said case.

4,683,776

TRANSMISSION GEARING ARRANGEMENT

Donald Klemen, Carmel, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 27, 1986, Ser. No. 833,260
Int. Cl.[4] F16H *57/10*
U.S. Cl. 74—765 **1 Claim**



1. A gearing arrangement for an automotive power transmission comprising:

an input shaft and an output shaft;

first, second, and third simple planetary gear sets each having a sun gear, a ring gear, and a plurality of planet gears meshing with said sun and said ring gears and rotatably supported on a planet carrier;

means rigidly interconnecting the ring gear of said third gear set and the carrier of said seocnd gear set;

means rigidly interconnecting the ring gear of said second gear set and the carrier of said first gear set;

means rigidly connecting said output shaft and the carrier of said third gear set;

a first intermediate shaft rigidly interconnecting the sun gears of said second and said third gear sets for unitary rotation;

a second intermediate shaft rigidly connected to the carrier of said second gear set;

a third intermediate shaft continuously connected to said input shaft and to the sun gear of said first gear set;

first, second, and third brake means operative to selectively brake rotation of the ring gears of said first, said second, and said third gear sets, respectively;

a first rotating clutch selectively operable to connect said input shaft and said first intermediate shaft for unitary rotation;

a second rotating clutch selectively operable to connect said input shaft and said second intermediate shaft for unitary rotation;

a fourth simple planetary gear set including a sun gear and a ring gear and a plurality of planet gears meshing with said sun and said ring gears and rotatably supported on a planet carrier;

means rigidly connecting the sun gear of said fourth gear set to said third intermediate shaft;

means rigidly connecting the ring gear of said fourth gear set to the carrier of said first gear set; and

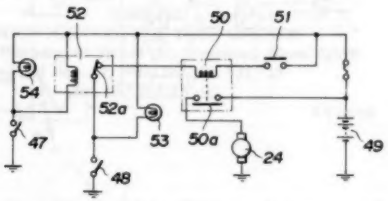
a fourth brake means selectively operable to brake the carrier of said fourth gear set, whereby nine forward ratios are obtainable while preserving a single transition shifting over the entire nine forward ratios.

4,683,777

INHIBITOR MEANS FOR A STARTER DEVICE IN A MULTI-TRANSMISSION MOTOR VEHICLE

Hitoshi Nakayama, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1984, Ser. No. 639,167
Claims priority, application Japan, Aug. 8, 1983, 58-143634
Int. Cl.[4] F02N *11/08, 11/10*
U.S. Cl. 74—850 **2 Claims**



1. An engine starter device in a motor vehicle including an engine, a primary transmission having at least one forward gear position and a neutral gear position, a secondary transmission operatively coupled with the primary transmission and having at least one forward gear position and at least one reverse gear position, and at least one driven wheel operatively coupled with the secondary transmission, said engine starter device comprising:

a power supply;

a starter motor connected to said power supply for starting the engine; and

switching means connected between said power supply and said starter motor for electrically connecting the power supply to the starter motor to start the engine when the primary transmission is in the neutral gear position and the secondary transmission is in a gear position other than the reverse gear position, said switching means comprising:

(a) first relay means connected between said power supply and said starter motor;

(b) a starter switch;

(c) a first detector for detecting the neutral gear position of said primary transmission, said first detector being energizable when said primary transmission is put in the neutral position;

(d) a second detector for detecting the reverse gear position of said secondary transmission, said second detector being energizable when said secondary transmission is put in the neutral position;

(e) an inhibitor relay connected to said second detector and actuatable when said second detector is turned on; and

(f) said starter switch, said first detector, and said inhibitor

relay being series-connected as a circuit for energizing said first relay means.

4,683,778

SYSTEM FOR SWITCHING A DRIVE DEVICE DEPENDENT ON SPEED

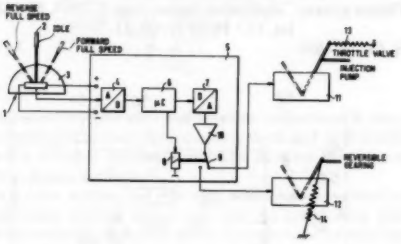
Manfred Pfalzgraf, Frankfurt am Main, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed May 7, 1986, Ser. No. 860,596

Claims priority, application Fed. Rep. of Germany, May 9, 1985, 3516635

Int. Cl.[4] B60K *41/18, 41/10*

U.S. Cl. 74—858 9 Claims



1. In a system for controlling a drive device, particularly a boat drive device, which comprises an internal combustion engine and a reversible gearing connected to the engine, there being an operating element connected to the engine and the gearing for adjusting the power and the direction of turning of an output rotation of the drive device, the improvement comprising

a control device containing a microcomputer, said operating element transmitting electric signals for power and for direction of turning to said control device;

separate power actuators connected to said control device for selecting a power of the internal combustion engine and for switching the reversible gearing; and wherein

said control device enables the switching of the reversible gearing only when a speed of rotation of the internal combusion engine is below a predetermined value; and wherein

said operating element comprises a lever having a central position associated with an idling speed of the internal combustion engine; and wherein

after a passing of the lever through said central position, one of said power actuators is held in an idling position and switching of the reversible gearing is delayed until the internal combustion engine has assumed the idling speed of rotation, while after the switching of the reversible gearing said one power actuator is advanced to a position which corresponds to the position of the lever; and wherein

delay in the switching of the reversible gearing continues for a period of time which is calculated by said microcomputer on a basis of properties of the drive unit and the speed of rotation before a passing of said lever through the central position.

4,683,779

METHOD AND APPARATUS FOR CONTROLLING CONTINUOUSLY VARIABLE TRANSMISSION FOR VEHICLE

Akinori Osanai, Susono; Takao Niwa, Toyota, and Takeshi Gono, Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

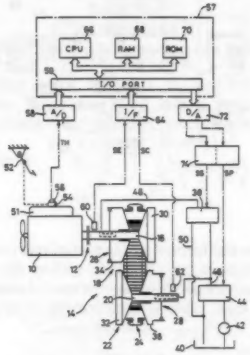
Filed Aug. 29, 1984, Ser. No. 645,283

Claims priority, application Japan, Sep. 1, 1983, 58-160898

The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.

Int. Cl.[4] B60K *41/14*

U.S. Cl. 74—861 9 Claims



1. A method of controlling a speed ratio of a continuously variable transmission for a vehicle for transmitting a rotary motion of an engine of the vehicle to drive wheels of the vehicle with a stepless speed change, by regulating the speed ratio of the transmission such that an actual speed of the engine coincides with a target engine speed, said method comprising the steps of:

determining a normal target speed based on a currently required output of the engine and according to a predetermined relation between said normal target speed and said required output, said normal target speed being normally used as said target engine speed to regulate said speed ratio of the transmission;

determining a rate of variation in the speed ratio of said variable transmission;

determining a transmission efficiency of said transmission based on the determined rate of variation in the speed ratio, and according to a predetermined relation between said transmission efficiency and said rate of variation;

determining a variation-restraint trigger speed of the engine based on the determined transmission efficiency of said transmission and based on said normal target speed so that said variation-restraint trigger speed is lower than said normal target speed and so that a difference between said trigger speed and said normal target speed is increased as said transmission efficiency is lowered;

checking whether the vehicle is in acceleration or not;

restraining said rate of variation in the speed ratio of the transmission during a first time span between a first moment when said actual speed of the engine has exceeded said variation-restraint trigger speed, and a second moment when said actual speed has reached said normal target speed, while said vehicle is in acceleration; and

selecting said variation-restraint trigger speed as a special target speed when said actual speed of the engine has been raised to said normal target speed with the restrained rate of variation in said speed ratio during acceleration of the vehicle, said special target speed being used as said target engine speed to regulate said speed ratio of the transmission during a second time span between said second mo-

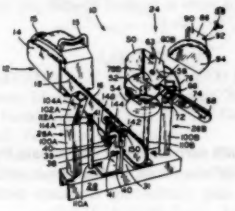
ment and a third moment when said actual speed of the engine has been lowered to said variation-restraint trigger speed.

4,683,780

SAW CHAIN SHARPENER

Arthur E. Robison, 6720 Bent Oak Highway, Adrian, Mich. 49221

Filed Jan. 13, 1986, Ser. No. 818,332
Int. Cl.[4] B23D *63/16*
U.S. Cl. 76—40 **20 Claims**



1. An apparatus for sharpening the left and right hand cutting teeth of a saw chain and grinding the rakers while said chain is mounted on a saw bar and comprising:

a base adapted for support by a substantially horizontal surface;

saw bar clamping means mounted on said base for clamping a saw bar in a substantially vertical position;

a grinding assembly including an electric motor having a rotatable output shaft and a grinding wheel mounted on said shaft for rotation therewith;

first and second grinding assembly mounting means for pivotably supporting said grinding assembly, said mounting means secured on said base respectively on opposite sides of said bar clamping means; and

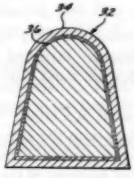
indexing means mounted on said clamping means and spaced from the grinding surface of said grinding wheel when said wheel is pivoted into the grinding position for selective supporting engagement with the saw chain cutting teeth to permit forward movement of a saw chain and to prevent rearward movement of said saw chain, said indexing means being adjustable to select the length to which said cutting teeth are to be ground.

4,683,781

CAST STEEL ROCK BIT CUTTER CONES HAVING METALLURGICALLY BONDED CUTTER INSERTS, AND PROCESS FOR MAKING THE SAME

Nareshchandra J. Kar, Westminster; William J. Salesky, Huntington Beach, and Steven J. Guzowski, Fountain Valley, all of Calif., assignors to Smith International, Inc., Newport Beach, Calif.

Division of Ser. No. 655,140, Sep. 27, 1984, abandoned. This application Aug. 15, 1986, Ser. No. 897,228
Int. Cl.[4] B22D *19/06*
U.S. Cl. 76—108 A **16 Claims**



1. A process for making a tool having at least one hard cermet cutter insert formed of a metal carbide partially embedded and held in a cast steel core, the process comprising the steps of:

depositing a first coating of a metal selected from a group consisting of copper and copper alloys on the cutter insert;

depositing a second coating of metal on top of said first coating of metal, said second coating of metal being selected such that it protects the first coating of metal from heat degradation;

disposing the cutter insert having the first and second coatings in a suitable mold in operative position for casting the steel core; and

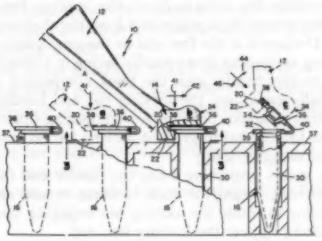
casting the steel core from molten steel into the mold thereby partially embedding the cutter insert in the steel core, the metal of the second coating being selected such that the coating does not substantially melt during the step of casting.

4,683,782

MICROCENTRIFUGE TUBE OPENER

Richard J. Warburg, 43 Spruce Dr., Westwood, Mass. 02090

Filed Nov. 17, 1986, Ser. No. 931,710
Int. Cl.[4] B67B *7/00*
U.S. Cl. 81—3.57 **5 Claims**



1. A microcentrifuge tube opener adapted to open a microcentrifuge tube comprising a container with an opening, and a lid for container, said lid having a lip projection extending past the outer perimeter of said opening, when said lid is placed above said opening, and a downwardly extending annular portion shaped to sealing fit inside said opening, said opener comprising:

a base, having a recess shaped to accept said lip projection, said base comprising:

a lower projection below and adjacent said recess, and

an upper projection above and adjacent said recess,

wherein said lower projection is positioned to engage said lip, and said upper projection is positioned to engage said lip and said lid and wherein said base cannot touch said annular portion of said lid when said lid is removed from said container and said lip is positioned in said recess,

wherein said lid can be moved from said container by positioning said lip in said recess and causing said lower projection to apply pressure to said lip away from said container and, at the same time causing said upper projection to apply pressure to said lid at a position distant from said lip in direction towards said container.

4,683,783

CAR DOOR OPENING TOOL AND METHOD

Victor V. Fanberg, 5221 Mt. Ariane Ter., San Diego, Calif. 92111

Continuation of Ser. No. 767,899, Aug. 21, 1985, abandoned, which is a continuation of Ser. No. 735,587, May 20, 1985, abandoned, which is a continuation of Ser. No. 520,485, Aug. 4, 1983, abandoned. This application Jun. 10, 1986, Ser. No. 872,540

Int. Cl.[4] E05B *19/20*; B25B *33/00*

U.S. Cl. 81—15.9 **15 Claims**

1. A vehicle door opening tool for opening a locked vehicle door from outside the vehicle, comprising:

an elongate shaft for inserting into the interior of the door of a vehicle through a gap between the glass and weather strip of the door, the shaft having a handle end and a locking car engaging end and being at least substantial straight between said ends, the length of the shaft being greater than the distance between the gap at the vehicle door and a locking bar within the vehicle door for opening the door;

locking bar engaging means projecting from the locking bar engaging end of the shaft for engaging around the locking bar within the vehicle door, the locking bar engaging means comprising a projection from the shaft and a generally U-shaped, at the free end or the projection, said hook having at opening downwardly facing in a direction opposite to said handle end, the hook comprising means for partially encircling the locking bar and having opposed generally parallel portions for contacting opposed points of the locking bar to grip the locking bar on axial twisting of the elongate shaft;

handle means projecting from the handle end of the shaft comprising means for axial twisting or said shaft by an operator to rotate the locking bar engaging means into a positiong ripping the locking bar; and

a string-like member secured to the hook, said string-like member comprising means for pulling by an operator and for transmitting pulling force of an operator into an unlatching force applied in a longitudinal direction of a locking bar engaged by the tool.

4,683,784

HAMMER

Patrick A. Lamont, Transvaal, South Africa, assignor to C.C.L. South Africa (Proprietary) Limited, South Africa

Filed Feb. 11, 1986, Ser. No. 828,179

Claims priority, application South Africa, Feb. 22, 1985, 85/1343

Int. Cl.[4] B25G *1/00*

U.S. Cl. 81—22 **1 Claim**

1. A hammer comprising

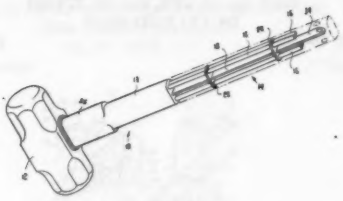
a hammer head

a handle connected to said hammer head, said handle being made from an elastomer,

a plurality of rod-shaped sprung steel reinforcing elements, and a steel strip-shaped reinforcing element, carried within said handle's elastomer, said elements extending over the effective length of said handle with said rod-shaped reinforcing elements located adjacent each of the flat sides of said strip-shaped element but spaced from it, and the general plane of said strip-shaped element being normal to the strike direction of said hammer head,

a plurality of spacers spaced over the length of the handle to maintain said elements in spaced relationship,

a bore within said hammer head within which said handle is located in said head,



a recess which surrounds the end of said bore on the opposite side of the head to that from which said handle projects, said reinforcing elements extending into said recess, and

a locking plate which is engaged with said reinforcing elements in said recess to prevent withdrawal of said handle from said recess.

4,683,785

METHOD OF CUTTING A WORM SCREW AND A WORM SCREW OBTAINED BY THE SAID METHOD

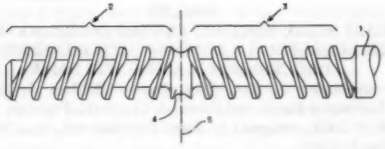
Hubert A. Perraudin, Champigny sur Marne, France, assignor to Equipements Automobiles Marchal, Issy-les-Moulineaux, France

Continuation of Ser. No. 243,805, Mar. 16, 1981, abandoned. This application Jan. 25, 1985, Ser. No. 695,068

Claims priority, application France, Mar. 25, 1981, 80 06581

Int. Cl.[4] B23B *1/00*; B23G *1/00*

U.S. Cl. 82—1 C **11 Claims**



1. A method of cutting, from a cylindrical shaft, a worm screw having two adjacent threaded portions with respective worm threads of opposite hand, said method comprising the steps of,

(a) mounting the shaft in a lathe,

(b) rotating the shaft with the lathe,

(c) initially forming a groove in the shaft between the two adjacent threaded portions of the worm threads to be cut, said groove forming a zone of separation,

(d) cutting a worm thread in the shaft of one hand, to one

side of said groove, by successive similar passes of a cutting tool whose approaching motion at the beginning of each pass is effected in the grooved zone of separation between the two threaded portions,

(e) cutting a second worm thread in the shaft of opposite hand, to the other side of said groove by successive similar passes of a cutting tool whose approaching motion at the beginning of each pass is effected in the grooved zone of separation between the two threaded portions,

wherein the worm threads cut in steps (d) and (e) are each of a predetermined depth and pitch, and

wherein said step (c) of intially forming the groove comprises forming a groove of a depth less than the depth of the threads but at least one half of the and two times the pitch of the threads formed in steps (d) and (e).

4,683,786

NUMERICALLY CONTROLLED LATHE

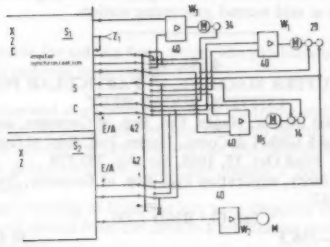
Günther Kersten, Hochdorf; Walter Klauss, Adelberg, and Jürgen Michl, Notzingen, all of Fed. Rep. of Germany, assignors to Traub AG, Fed. Rep. of Germany

Filed Apr. 14, 1986, Ser. No. 851,455

Claims priority, application Fed. Rep. of Germany, May 24, 1985, 3518792

Int. Cl.[4] B23B *3/30*

U.S. Cl. 82—2 B **10 Claims**



1. A numerically controlled lathe comprising a main spindle, at least two cross slides opposite said main spindle, the first cross slide being provided with a driven tail spindle and a first saddle, the second cross slide being provided with a second saddle, a third cross slide at the main spindle end, and a first control system including X-axis control, Z-axis control, and C-axis control with positional adjustment, the C-axis control for selectively controlling one of said main spindle and said tail spindle, such that a workpiece supported by the main spindle may be machined simultaneously with two tools which are supported by said first and second saddles whereby said C-axis control is applicable to the main spindle and that a workpiece supported by the tail spindle may be machined with a tool supported by the third saddle under control of said first cross slide whereby said C-axis control is applicable to said tail spindle.

4,683,787

METHOD OF MACHINING A WORKPIECE IN A TURRET LATHE AND AN NC LATHE FOR PERFORMING THIS METHOD

Helmut F. Link, Aichwald, Fed. Rep. of Germany, assignor to Index-Werke Komm.-Ges. Han & Tessky, Esslingen, Fed. Rep. of Germany

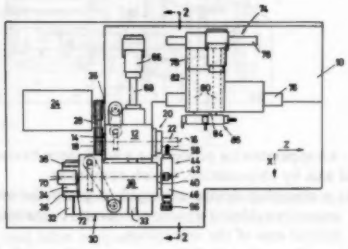
Division of Ser. No. 636,886, Aug. 2, 1984, Pat. No. 4,635,340. This application Nov. 20, 1986, Ser. No. 933,010

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1983, 3328327

Int. Cl.[4] B23B *5/44, 5/36*

U.S. Cl. 82—18 **14 Claims**

1. In an NC lathe, comprising a main spindle mounted for rotation in a spindle stock about a main spindle axis; a main motor for rotatably driving said main spindle about said main spindle axis; a workpiece chuck means mounted on said main spindle; a tool turret arranged adjacent said main spindle; means for rotatably mounting said tool turret; means for rotatably driving said tool turret about a tool turret axis parallel to the main spindle axis; said tool turret comprising a turret body and at least one turret spindle for holding a tool rotatably mounted in said turret body; means for rotatably driving said turret spindle about a turret spindle axis extending radially to the turret axis; a carriage bearing said tool turret for slidable displacement transversely to the main spindle axis, and a carriage drive for slidably displacing said carriage, the improvement comprising NC control means operatively connected to said main motor, the tool turret driving means, and said car-



riage drive for effecting controlled, stepless, transverse displacement of the carriage and controlled stepless rotation of the main spindle and of the tool turret such that simultaneously

(a) the main spindle is rotated about the main spindle axis in a defined direction of rotation and with a defined angular velocity dγ/dt;

(b) the turret spindle is rotated about the turret spindle axis;

(c) the turret is rotated about the turret axis in the defined direction of rotation and with said defined angular velocity;

(d) the carriage is displaced transversely to the main spindle axis at a velocity dX/dt

said velocities being the first derivatives of the following equations:

$$\gamma = \arctan \frac{Y_o - v_y \cdot t}{A}$$

$$X = \sqrt{A^2 + (Y_o - v_y \cdot t)^2}$$

wherein t, γ, X, A, Y_o, and v_y denote the following:

t=the time which is equal to zero when a tool carried by said turret spindle touches a workpiece carried by said chuck means for the first time;

γ=the angle between the turret spindle axis and a first plane defined by the main spindle axis and the turret axis;

X=the distance of the turret axis from the main spindle axis;

A=the distance of the turret axis from the normal projection of the main spindle axis onto a second plane defined by the turret axis and the turret spindle axis, which plane pivots about the turret axis;

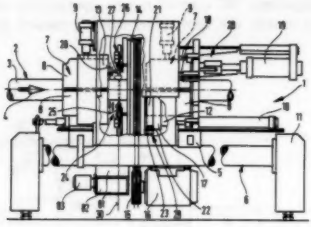
Y=the distance of the main spindle axis from said second plane, with Y_o being the value of Y when t equals zero;

v_y=the feed velocity dy/dt of the turret spindle axis relative to the main spindle axis in the direction of diminishing values of Y.

4,683,788
METHOD OF AND APPARATUS FOR CHIP-CUTTING OF WORKPIECES

Kurt Kronawittleithner, Bad-Hall, and Alfred Pfarrsbacher, Micheldorf, both of Austria, assignors to Bergsmann Apparatebau Gesellschaft m.b.H. & Co. KG., Micheldorf, Austria

Filed Jan. 17, 1986, Ser. No. 820,710
Claims priority, application Austria, Jan. 28, 1985, 213/85
Int. Cl.[4] B23B *1/00, 5/14*
U.S. Cl. 82—47 **10 Claims**



1. An apparatus for processing a workpiece having a longitudinal axis by chip-cutting, which comprises

(a) a clamping device arranged to grasp the workpiece at respective sides of a plane of rotation containing the longitudinal axis of the workpiece,

(b) a chip-cutting tool for processing the workpiece,

(c) a rotatable tool carrier having a sliding guide extending in a radial direction with respect to the longitudinal axis of the workpiece and slidably supporting the chip-cutting tool,

(d) a guiding track arranged parallel to the longitudinal axis of the workpiece and displaceably mounting the tool carrier,

(e) a feed drive coupled to the tool carrier for displacing the tool carrier along the guiding track,

(f) a rotational drive coupled to the tool carrier for rotating the tool about the longitudinal axis of the workpiece, and

(e) means for displacing the chip-cutting tool radially along the sliding guide and arranged to generate an undulant displacement motion, the undulant displacement motion means including

(1) an eccentric guiding roller coupled to the rotatable tool carrier, and

(2) a non-rotatable circular track extending concentrically about the longitudinal axis of the workpiece and having a guiding surface engaging the guiding roller during rotation of the tool,

(3) the guiding roller having a peripheral length smaller than an even fraction of the peripheral length of the guiding surface.

4,683,789
METHOD AND APPARATUS FOR SEPARATING PRINTED CIRCUIT BOARDS FROM MULTI-BOARD PANELS

Gilbert T. Lopez, Longmont, Colo., assignor to Cencorp, Boulder, Colo.

Division of Ser. No. 689,078, Jan. 4, 1985, Pat. No. 4,621,552. This application Apr. 11, 1986, Ser. No. 850,622
Int. Cl.[4] B26D *5/26*
U.S. Cl. 83—35 **4 Claims**

1. A method of handling a panel automatedly, said panel having means for referencing positional control of said panel, and comprising the steps of:

receiving said panel at a feed assembly input;

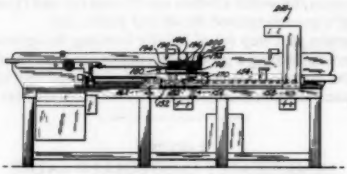
searching for said panel referencing means;

clamping said panel according to and upon locating said reference means;

feeding said panel, while clamped, to a processing station and indexing said feeding according to a controller;

subdividing said panel at said processing station according to said controller;

gripping a panel portion to an output side of said processing station;



transferring said panel portion to a second processing station;

rotating said panel portion about an axis generally normal to a top surface of said panel portion;

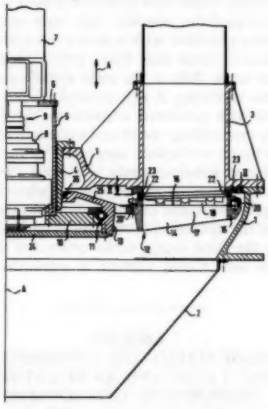
indexing said panel portion, according to said controller, to said second processing station to facilitate dual-axis processing of said panel; and

effecting said dual-axis processing by subdividing said panel portion at said second processing station.

4,683,790
DISC CUTTER MACHINE, IN PARTICULAR FOR CUTTING SUGAR BEET

Hans-Joachim Bittner, Hagen, Fed. Rep. of Germany, assignor to H. Putsch GmbH & Comp., Hagen, Fed. Rep. of Germany

Filed Oct. 15, 1985, Ser. No. 787,775
Claims priority, application Fed. Rep. of Germany, Nov. 26, 1984, 3443032
Int. Cl.[4] B26D *1/00*
U.S. Cl. 83—356.3 **10 Claims**



1. Disc cutter machine, in particular for cutting of sugar beet, comprising a machine frame, a disc cutter having a flat upper surface and having uniformly distributed passages extending longitudinally and in the radial direction, for the cut product, comprising blade receivers arranged in the region of the passages and a bearing and drive for the disc cutter, wherein the blade receivers are mounted on the upper surface of the disc cutter and the disc cutter is comprised of inclined ribs extending radially and at a uniform mutual spacing to

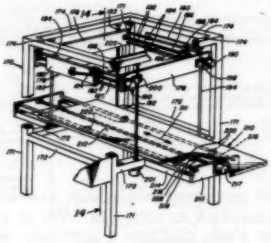
define said passages in the region of the blade receivers wherein the inclined ribs are connected in the region of their inner ends facing the disc cutter axis to the hub ring and in the region of their outer ends to a peripheral ring of the disc cutter, and wherein the height of the ribs increases towards the disc cutter axis.

4,683,791

CUTTING APPARATUS

Allan S. Demont, Holden, Mass., assignor to 501 Keene Corp., Norwalk, Conn.

Filed Feb. 2, 1984, Ser. No. 576,484
Int. Cl.[4] B26F *3/12*; B26D *1/553*
U.S. Cl. 83—874 **5 Claims**



1. Apparatus for cutting foam or the like products into predetermined patterns comprising;

a frame,

a table disposed at a lower position in the frame and having means for receiving the product that is to be cut,

means for driving the table only in one non-oscillatory horizontal direction in the frame and during a first cutting sequence,

a carriage carrying at least one hot wire disposed over the table and spaced from the table in a pre-cutting position of the carriage,

means for supporting the carriage from the frame,

drive mcans associated with the carriage for controllably driving the carriage only in one non-oscillatory vertical direction in the frame relative to the table and orthogonal to said direction of table drive and during a first cutting sequence,

and control means for controlling the carriage and table drive means to control product cutting along a predetermined diagonal path including means for providing simultaneous drive to both said carriage and table drive means at relative constant speeds that control the slope of the diagonal cut.

4,683,792

CUTTING APPARATUS

Allen Demont, 41 Valley Hill Dr., Holden, Mass. 01520

Continuation-in-part of Ser. No. 576,484, Feb. 2, 1984. This application Feb. 25, 1985, Ser. No. 704,773
Int. Cl.[4] B26F *3/12*; B26D *1/553*
U.S. Cl. 83—874 **16 Claims**

1. Apparatus for cutting a block into a structure having multiple diagonal cuts forming a uniform array of pyramidal-shaped projections and comprising;

a frame,

a table supported in the frame at a lower position of the frame,

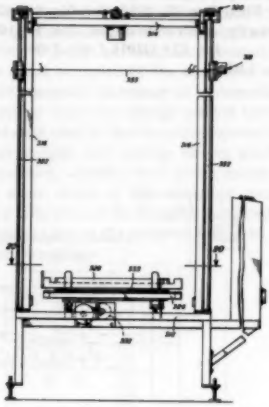
means for driving the table in a linear horizontal direction at a constant controlled speed during a diagonal cut,

at least one cutting hot wire,

means supporting the hot wire from the frame at a position over the table,

and means for driving the hot wire support means in a linear vertical direction at a constant controlled speed during a diagonal cut,

said table including a platform upon which the block is retained and a table support,



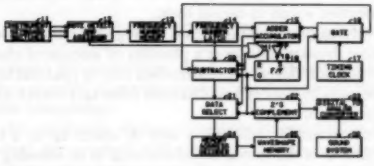
said platform being rotatable relative to said table support as well as being moveable in a linear horizontal direction along with said table support.

4,683,793

DATA REDUCTION FOR A MUSICAL INSTRUMENT USING STORED WAVEFORMS

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instrument Mfg. Co., Ltd., Hamamatsu, Japan

Filed Feb. 10, 1986, Ser. No. 827,983
Int. Cl.[4] G10H *7/00*
U.S. Cl. 84—1.01 **10 Claims**



10. In combination with a musical instrument, having an array of keyswitches, in which a musical tone is created by reading out stored waveshape data, apparatus for producing a musical tone comprising;

an assignor means for assigning one of a plurality of tone generators to an actuated one of said array of keyswitches, and

said plurality of tone generators each of which comprises,

a waveshape memory means for storing a plurality of segments of data words stored in contiguous segments of data words,

a memory addressing means whereby successive segments of data words are read out from said waveshape memory means for a preselected number of repetitions before the read out is advanced to an adjacent segment of data words,

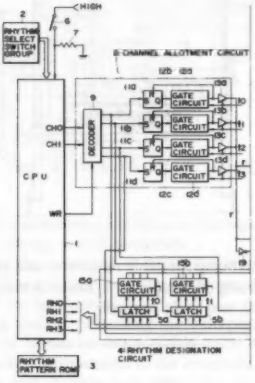
a conversion means for producing a musical tone responsive to data words read out from said waveshape memory means.

4,683,794

AUTOMATIC MUSIC PLAYING APPARATUS CAPABLE OF PRODUCING A PLURALITY OF DIFFERENT SOUNDS SIMULTANEOUSLY

Shigeo Sakashita, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,630
Claims priority, application Japan, Jan. 19, 1985, 60-7871
Int. Cl.[4] G10H *1/42, 7/00*
U.S. Cl. 84—1.03 13 Claims



1. An automatic music playing apparatus, comprising:

waveform data memory means for storing a plurality of different waveform data, each of which represents a respective sound in digital form;

waveform data reading means arranged for operation on a time division basis over a plurality of associated channels, wherein different waveform data can be read out simultaneously by way of said channels from said waveform data memory means;

select means for enabling a user to select up to a certain number of the stored waveform data to be sounded simultaneously, said certain number corresponding to the number of said channels;

waveform designating means for providing waveform designation data to designate at least one of the stored waveform data for reading out from said waveform data memory means, in response to said select means;

channel allotting means coupled to said waveform designating means, for allotting said waveform designation data from said waveform designating means to selected ones of the channels associated with said waveform data reading means, including means for allotting more than one of said channels to the same stored waveform data when the same data is selected more than once by said select means; and

sounding means for converting the waveform data read out from said waveform data memory means by way of said channels into musical sounds;

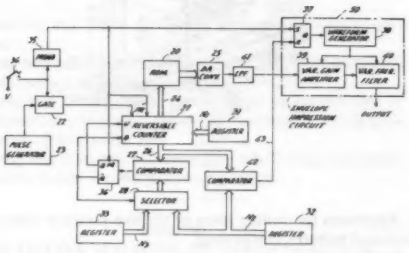
wherein the same stored waveform data can be sounded simultaneously by said sounding means without sound interruption when the same data is selected successively by the user.

4,683,795

PERIODIC WAVE FORM GENERATION BY RECYCLICALLY READING AMPLITUDE AND FREQUENCY EQUALIZED DIGITAL SIGNALS

Masatsugu Kitamura, Atsugi; Kikuji Wagatsuma, Sagamihara; Tokumi Watanabe, Tokyo; Naoki Yamashita, Tokyo, and Hiroshi Yoshida, Tokyo, all of Japan, assignors to Victor Company of Japan, Japan

Continuation of Ser. No. 664,490, Oct. 24, 1984, abandoned.
This application Oct. 31, 1986, Ser. No. 925,477
Claims priority, application Japan, Oct. 28, 1983, 58-202407; Nov. 10, 1983, 58-211345
Int. Cl.[4] G10H *1/02, 7/00*
U.S. Cl. 84—1.26 18 Claims



1. An electronic musical instrument for generating an aperiodic waveform having a series of consecutive sections including a rapidly rising section having a larger content of higher harmonics, a rapidly decaying section having a lesser content of said higher harmonics and a gradually decaying section having a least content of said higher harmonics, said aperiodic waveform having a spectral distribution profile which varies as a function of time elapsed from onset of said rapidly rising section, comprising:

a memory having a first portion storing data representing amplitudes and spectral distribution profiles of only said rising section and said rising section and a second portion storing data representing scaled amplitudes of only said rapidly decaying section, said scaled amplitudes having peaks equal to the amplitude at a transition between said rapidly rising section and rapidly decaying section, the data stored in said second portion further representing scaled spectral distribution profiles each of which is substantially equal to the spectral distribution profile at said transition;

first means for addressing said first portion of the memory in a forward scan for generating a first output waveform and subsequently addressing said second portion recyclically in forward and rearward scans for generating a second output waveform;

second means for impressing a monotinically decaying envelope upon said second output waveform; and

third means for impressing a monotonically decaying spectral distribution profile upon said second output waveform, said second and third means being connected in circuit to said memory to combine said first output waveform with the outputs of said second and third means thereby to generate a replica of said aperiodic waveform.

4,683,796

MOUTHPIECES FOR MUSICAL WIND INSTRUMENTS

William Salaman, 16, Ullswater Ave., Cardiff CF2 5PT, and Bernard E. Richardson, 113 Bryn Pinwydden, Pennwyn, Cardiff CF2 7DG, both of United Kingdom

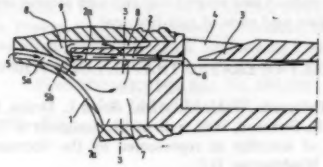
PCT No. PCT/GB85/00317, § 371 Date Mar. 12, 1986, § 102(e) Date Mar. 12, 1986, PCT Pub. No. WO86/00739, PCT Pub. Date Jan. 30, 1986

PCT Filed Jul. 15, 1985, Ser. No. 845,695

Claims priority, application United Kingdom, Jul. 13, 1984, 8417885

Int. Cl.[4] G10D 7/02

U.S. Cl. 84—380 C 7 Claims



1. A mouthpiece for a musical wind instrument, the mouthpiece comprising an inlet, an outlet, an enclosed windway formed by a tube which has a tube inlet and a tube outlet constituting the outlet of the mouthpiece, and a hollow chamber surrounding the tube for collecting liquid from inlet air, the inlet of the mouthpiece leading into the hollow chamber and the tube inlet being in communication with the hollow chamber.

4,683,797

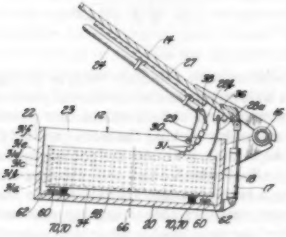
LINE CHARGE DETONATION INTERLOCK ASSEMBLY

Donald R. Wittbrodt, Warren, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 2, 1986, Ser. No. 903,807

Int. Cl.[4] F41H 11/00

U.S. Cl. 89—1.13 4 Claims



1. In a military system for destroying mines in an enemy mine field, said system comprising a platform (20), a rocket and rocket launch means disposed above the platform, a container (34) positionable on the platform below the rocket, a flexible mechanical line (28) of substantial length having explosive charges extending therealong, said line having its opposite ends connected to the launch means and to the rocket, said line and associated charges being stored in coiled condition within the container, said line and rocket being oriented so that after the rocket is launched the line and associated explosive charges are strung out on enemy terrain containing suspected mines, and a detonation circuit for detonating the explosive charges when they are in place on enemy terrain:

the improvement comprising electro-mechanical means for preventing detonation of the explosive charges while the explosive charges are stored in the container, said detonation-prevention means comprising switch means (56) for interrupting the detonation circuit, and weight-responsive actuator means for moving the switch means to a circuit-interrupt condition when the aforementioned container is loaded with explosive charges; said weight-responsive actuator means comprising two laterally spaced plates (64) extending horizontally above the platform substantially equidistant from an imaginary centerline taken through the space occupied by the container, said plates being floatably mounted to engage an undersurface of the container; and at least two springs trained between said platform and each plate to bias the plates upwardly against the container weight, said springs having similar force-rate characteristics, whereby each spring carries approximately the same share of the container weight; said springs being effective on the floatably-mounted plates to lift the container clear of the platform when the container is in an empty condition.

4,683,798

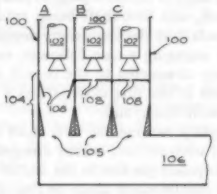
GAS MANAGEMENT TRANSITION DEVICE

Edward T. Piesik, Pomona, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed Dec. 27, 1985, Ser. No. 813,820

Int. Cl.[4] F41F 3/04

U.S. Cl. 89—1.816 10 Claims



1. Apparatus for controlling the flow of exhaust gases of missiles in a plurality of missile storage chambers during firing of a missile comprising:

a plurality of missile storage chambers oriented generally adjacent one another, said chambers having a generally rectilinear cross-section over the major extent thereof;

a plenum chamber extending generally along the bottom of said storage chambers and coupled to each storage chamber for disposing of exhaust gases generated in said storage chambers by the firing of a missile therein; and

a plurality of transition sections, one for each storage chamber, extending between respective chambers and the plenum chamber, each transition section including;

(a) a pair of doors pivotably mounted on a first pair of opposite sides of the transition section adjacent the juncture of the transition section with its associated chamber, said doors being pivotable between open and closed positions in response to gas pressure forces generated during the firing of a missile, said doors when in the closed position serving to close off the transverse bottom opening of the chamber; and

(b) a plurality of tapered fillets formed in the corners of the rectilinear walls of the storage chamber smoothly changing the cross-sectional opening of the chamber from a rectilinear shape to a round opening.

4,683,799

ARRANGEMENT FOR RAPIDLY STOPPING AN AUTOMATIC WEAPON HAVING AN EXTERNAL DRIVE

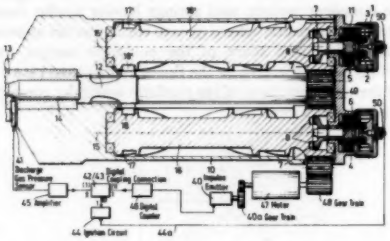
Lothar Post, Dusseldorf, and Bernhard Schneider, Niederkrüchten, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Dusseldorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 584,802, Feb. 29, 1984, abandoned. This application May 3, 1985, Ser. No. 729,996

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1983, 3307882

Int. Cl.[4] F41D *7/02, 11/00*

U.S. Cl. 89—11 **5 Claims**



1. An arrangement for rapidly stopping an automatic weapon having an external drive, and wherein the gun barrel is connected to the breech housing, said arrangement comprising a cartridge chamber within said breech housing, a lockable breech block reciprocally movably mounted in the breech housing, and means for effecting the reciprocal movement of the breech block comprising at least on first shaft or a pair of first shafts bilaterally mounted relative to the breech block in the breech casing and parallelly disposed with respect to each other with their axes of rotation parallel relative to the path of the breech block, said first shaft being rotatable by external drive means, each first shaft coaxially supporting an annular cam, each cam engaging a cam follower, each cam follower being operatively connected to the breech block such that a rotary movement of the first shaft effects a reciprocal movement of the breech block; and

means for rigidly locking the first shaft against rotational movement, wherein said means comprises a plurality of coaxially disposed pockets in the end of each first shaft, a respective second claw shaft having claws on the end thereof confronting the pockets in the end of each first shaft, and a plurality of clutch discs coaxially mounted on each second claw shaft, and means comprising pyrotechnical ignition charges mounted in respective members forming rear extension of each claw shaft.

4,683,800

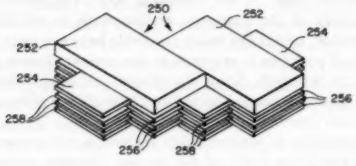
MODULAR ARMOR

Richard S. Snedeker, Cranbury, N.J., assignor to Aeronatical Research Associates of Princeton, Inc., N.J.

Filed Nov. 25, 1985, Ser. No. 802,190

Int. Cl.[4] F41H *5/16*

U.S. Cl. 89—36.02 **54 Claims**



1. A cruciform armor element which interfits with a plurality of similar elements to form a self-supporting armor layer, the element comprising:

a first rectangular parallelepiped leaf having a thickness, width, and a length which is substantially twice the width such that said first leaf defines a pair of ends, a pair of sides, a top and a bottom;

a second rectangular parallelepiped leaf having substantially the same width and length of said first leaf such that said second leaf defines a pair of ends, pair of sides, a top and a bottom;

at least one flat pocket formed in one of said leaves;

a block formed from a material different from said leaves which is received in said pocket; and

a means for attaching said bottom of said first leaf to said top of said second leaf such that said first leaf is intermediate said ends of said second leaf and said second leaf is intermediate said ends of said first leaf.

4,683,801

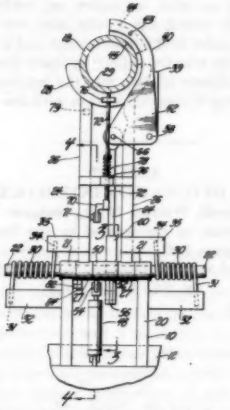
REMOTELY-OPERATED TRAVEL LOCK FOR VEHICLE MAIN GUN

Faro D. Palazzolo, Oakland, Mich.; Brian L. Drake, Cook, and Ralph R. Swanson, Will, both of Ill., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 16, 1986, Ser. No. 864,639

Int. Cl.[4] F41H *7/12*

U.S. Cl. 89—40.12 **10 Claims**



1. In association with a military vehicle having a main gun disposed for adjustments in the elevational plane: the improvement comprising a travel lock mechanism positioned on the vehicle for releasably locking the main gun in a fixed position relative to the vehicle, whereby the gun has minimal tendency to adversely affect vehicle road performance; said mechanism comporising a base structure (**10**) secured to the vehicle; an elongated arm structure (**24**) swingably attached at one end thereof to the base structure for movement around a horizontal axis between a prone position and an upright position; a gun seat (**28**) located on the other end of the arm structure for supportably engaging the undersurface of a gun barrel when the arm structure is in its upright position; a clamp device (**40**) having a movable connection (**38**) with the arm structure, whereby said clamp device can move between a closed condition engaged with the upper surface of the gun barrel and an open condition disengaged from the gun barrel; a crank arm (**50**) rotatably attached to the base structure for movement around a horizontal axis between first and second positions; an elongated link member (**60**), one end of said link member having a pivot connection with the crank arm, the other end of the link member having a pivot connection with the clamp device; means (**72,70**) responsive to movemment of the gun barrel away from the gun seat to latch said elongated arm structure to the crank arm; and a reciprocable power means (**48,49**) trained

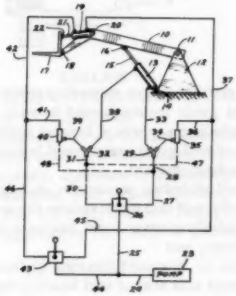
between said base structure and said crank arm, whereby motion of said power means is one direction rotates the crank arm from its first position to its second position so that the associated link member raises the elongated arm structure from its prone position to its upright position while the clamp device is retained in its open condition, after which the gun barrel can be lowered onto the gun seat to unlatch the crank arm from the elongated arm structure; motion of the power means in the other direction being then effective to shift the clamp device from irs open condition to its closed condition while returning the crank arm to its first position.

4,683,802

DIVIDED FLOW SELF-LEVELING SYSTEM

James A. Prokop, St. Paul, and David C. Truehart, Minneapolis, both of Minn., assignors to Lull Engineering Company, Inc., St. Paul, Minn.

Filed Mar. 15, 1984, Ser. No. 589,950
Int. Cl.[4] F15B *11/00*
U.S. Cl. 91—516 **13 Claims**



1. In combination, a vehicle utilizing a hydraulic boom cylinder to operate a lifting boom and a hydraulic carriage cylinder to operate a material handling carriage, each of said cylinders including a piston, said pistons when moved toward their "up" sides causing the boom and carriage to move in one direction and when moved toward their "down" sides causing the boom and carriage to move in the opposite direction, and a load self-leveling system for said vehicle, said system comprising a pair of fluid flow dividers interposed in flow lines between a source of hydraulic fluid under pressure and the hydraulic cylinders operating the boom and carriage, said flow dividers being structured to direct a greater flow of hydraulic fluid to the boom cylinder and a lesser flow to the carriage cylinder, each of said flow dividers being a reciprocable spool valve in a flow passage between said source of hydraulic fluid and said cylinders, said system including:

(A) a housing for said flow divider spool valves,

(B) a pair of "up" and "down" mode inlet-outlet ports in said housing for connection to said source of hydraulic fluid, and at least two pairs of "up" and "down" mode outlet-inlet ports in said housing for connection to said cylinders,

(C) separate passages connecting one of said inlet-outlet ports to one of said pairs of outlet-inlet ports, and

(D) said spool valves each comprising:

(1) an elongated cylindrical body having a transverse passage between the ends thereof and an axially extending passage in each end, and

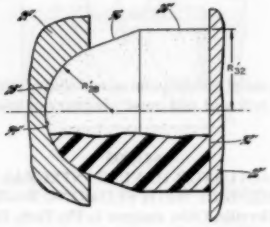
(2) a pair of restricted flow axial apertures between said transverse passage and said axially extending passages, one of said apertures being significantly smaller than the other.

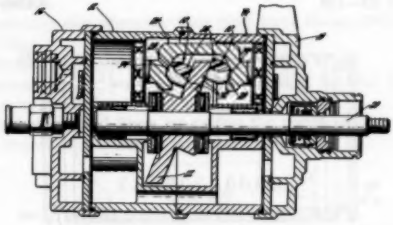
4,683,803

SWASH PLATE COMPRESSOR HAVING INTEGRAL SHOE AND BALL

Gary T. Miller, Amherst; Richard L. Marker, Lockport, both of N.Y., and Ronald E. Marker, New Lebanon, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 818,014, Jan. 13, 1986, Pat. No. 4,617,856. This application Mar. 24, 1986, Ser. No. 843,276
Int. Cl.[4] F04B *1/16*; F01B *3/02*; S16C *5/00*
U.S. Cl. 92—71 **2 Claims**





1. A swash plate compressor having a piston driven by a swash plate through a ball and shoe arrangement characterized by the ball and shoe arrangement comprising a plastic cylindrical body having a flat surface at one end that is slidably engaged by one side of the swash plate and further having a semi-spherical surface at an opposite end that is received under preload in a semi-spherical socket in the piston, said body being made of plastic having a coefficient of thermal expansion greater than and a coefficient of friction less than steel and brass and further having a compliance while being resistant to permanent deformation such that at assembly the pre-load forces the semi-spherical end to tightly seat in the socket, and said flat surface and semi-spherical surface having substantially equal working areas.

4,683,804

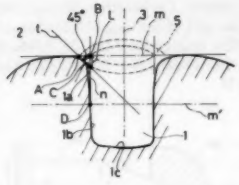
SWASH PLATE TYPE COMPRESSOR SHOE

Kenichiro Futamura, and Keiichiro Ohtsu, both of Aichi, Japan, assignors to Taiho Kogyo Kabushiki Kaisha, Toyota and Toyoda Jidoshokki Seisakusho, Kariya, both of, Japan

Filed May 14, 1985, Ser. No. 734,019
Claims priority, application Japan, Jan. 18, 1985, 60-6841; Jan. 19, 1985, 60-8130
Int. Cl.[4] F01B *3/00*; F04B *1/12*
U.S. Cl. 92—71 **4 Claims**

1. In a swash plate type compressor shoe having a sliding contact surface for making sliding contact with a swash plate, said sliding contact being formed with a hole, the improvement wherein a sliding contact surface between said hole and an outer periphery of said shoe is formed as a convex surface comprising a crest portion and surfaces smoothly continuous

with both sides of said crest portion and lower than said crest portion, said crest portion being located substantially at or



inwardly of a radial middle point of said sliding contact surface between said hole and said outer periphery of said shoe.

4,683,805

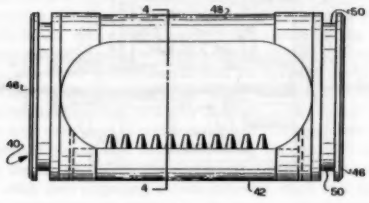
ROTARY ACTUATOR HAVING INTEGRAL PISTON ASSEMBLY WITH FLOATING RACK

Julius Fejes, Orrville, Ohio, assignor to Flo-Tork, Inc., Orrville, Ohio

Continuation of Ser. No. 715,838, Mar. 25, 1985, abandoned. This application Jun. 30, 1986, Ser. No. 880,195

Int. Cl.[4] F16J *1/10;* **F01B** *9/00*

U.S. Cl. 92—129 **4 Claims**



1. In a fluid cotnrolled rotary actuator of the rack and pinion type including a housing having a cylinder wall defining a chamber having a rack and pinion therein, said chamber including a piston bore;

the improvement comprising a rack and piston assembly reciprocable in said bore,

said rack and piston assembly comprising

(a) a one-piece rack insert having rack teeth and a rack bearing surface, said rack bearing surface being adapted to bear against and slide along said cylinder wall, and

(b) a one-piece piston member having a piston at each end, a support strut extending from one piston to the other, and lugs extending inwardly from each of sid pistons for engaging said rack insert whereby said rack insert is free to float in toward or away from the cylinder wall but is constrained from longitudinal movement with respect to said piston.

4,683,806

PISTON GUIDE FOR HOLLOW PISTON OF A RADIAL PISTON ENGINE

Clemens Ryzner, Sprockhovel, Fed. Rep. of Germany, assignor to Paul Maschinenfabrik GmbH & Co. KG, Witten, Fed. Rep. of Germany

Filed Aug. 6, 1985, Ser. No. 762,783

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1984, 3430362

Int. Cl.[4] F01B *15/00*

U.S. Cl. 92—66 **4 Claims**

1. A radial piston engine comprising:

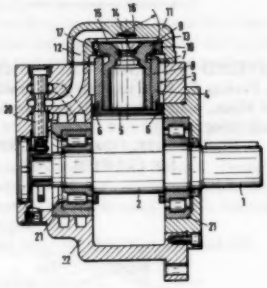
an output shaft,

an eccentric mounted on said output shaft and having a circumferential surface,

a housing

at least one hollow piston of pot-shaped construction having one closed end and a cavity in a central portion therein, said piston being mounted on said circumferential surface of said eccentric, such that said cavity opens radially outwardly, said piston being slidably mounted in said housing,

hollow guide means positioned in said housing and cooperating with said piston, said guide means including a cavity



engaging portion and a mounting portion to pivotably mount said guide means in said housing, said mounting portion including a spherical bearing surface on the radial outer end of said guide means, said bearing surface being directed radially inward,

a bearing shell including an annular seat for receiving said bearing surface of said guide means, the annular seat being directed radially outward and having a spherical outline external shape, and

biasing means to bias said bearing surface of said guide means against said seat of said bearing shell.

4,683,807

VACUUM BRAKE BOOSTER ASSEMBLY

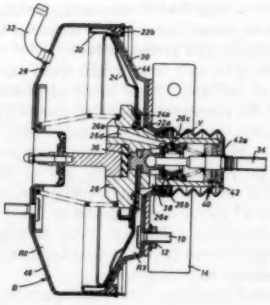
Michiharu Nishii; Youichi Furuta; Kaoru Tsubouchi, all of Kariya; Takeo Marata, Toyota; Juichi Shibatani, and Takashi Kiriyama, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Aug. 8, 1984, Ser. No. 638,772

Claims priority, application Japan, Aug. 8, 1983, 58-123028[U]

Int. Cl.[4] F01B *11/02*

U.S. Cl. 92—169 **5 Claims**



1. A vacuum-actuated brake power booster assembly for an automobile having a dash panel located in a passenger com-

partment and a mounting bracket arranged in the passenger compartment and fixed to said dash panel, comprising:

a housing assembly which includes front and rear housing shells divided internally by a diaphragm and a power piston into a vacuum chamber and a variable pressure chamber, said housing assembly being mounted on said bracket in such a manner that the rear housing shell faces said dash panel; and

a noise dampening sheet secured along its entirety to the outer surface of the rear housing shell so as to be located between said outer surface of the rear housing shell and said mounting bracket and form an external wall for the variable pressure chamber in such a manner that the rear housing shell is exposed only in a zone which is fitted in use to said mounting bracket.

4,683,808

LIGHT ALLOY PISTON FOR INTERNAL COMBUSTION ENGINES

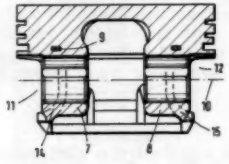
Erich Wacker, Heilbronn; Ulrich Landau, Oedheim; Wilfried Sander, Neckarsulm, and Klaus Schellmann, Weinsberg, all of Fed. Rep. of Germany, assignors to Kolbenschmidt Aktiengesellschaft, Neckarsulm, Fed. Rep. of Germany

Filed Jun. 17, 1985, Ser. No. 745,780

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1984, 3425965

Int. Cl.[4] F16J *1/04*

U.S. Cl. 92—208 **4 Claims**



1. In a light alloy piston for an internal combustion engine, wherein the piston includes bosses, a piston pin, a piston shirt having a closed lower end and which is inwardly offset from the outside peripheral surface of the piston, at locations disposed adjacent to the bosses on both sides of a horizontal plane extending through the piston pin, to such an extent that the distance between outer ends of the bosses amounts to 60 to 80% of the piston diameter and the overall width of the load carrying portion of the skirt amounts to 70 to 95% of the piston diameter, the improvement wherein the inwardly offset portions of the piston skirt form recesses, the piston skirt has end portions which extend below and adjoin the recesses and which are inwardly offset from the outside peripheral surface of the piston, the skirt has walls which extend at right angles to a vertical plane through the piston pin and which extend at right angles to the axis of the piston end portion of the piston skirt and are outwardly convexly locally increased and the overall width of the skirt in the vertical plane through the piston pin is larger by 15 to 35% than the smallest width of the skirt on both sides of the horizontal plane through the piston pin.

4,683,809

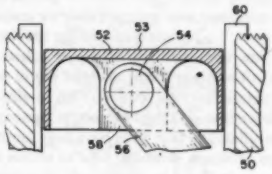
LIGHTWEIGHT PISTON

Allan H. Taylor, Newport News, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 2, 1985, Ser. No. 729,767

Int. Cl.[4] F16J *1/04*

U.S. Cl. 92—208 **18 Claims**



1. The method of making a carbon-carbon piston comprising the steps of:

placing a precursor fiber in a mat or random fiber orientation in a closed die;

pyrolizing said precursor fibers;

impregnating said precursor fibers with a carbonaceous resin system;

stretching said precursor fiber prior to or during stabilization;

stabilizing said material by heating the fiber in air;

carbonizing said material by slowly heating the fiber in an inert atmosphere; and

graphitizing said fibers by raising the temperature to the desired heat treatment temperature.

4,683,810

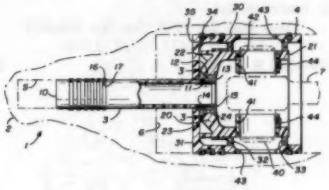
TWO-STAGE COMPOSITE PISTON

Khurshid A. Afimiwala, Orchard Park, N.Y., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Dec. 13, 1984, Ser. No. 681,350

Int. Cl.[4] F16J *1/04*

U.S. Cl. 92—212 **12 Claims**



1. A composite two-stage piston, comprising:

an annular cup;

a hollow annular core bonded to the periphery of said annular cup having an outer shell sized to receive a connecting rod within its interior;

coupling means in said annular shell adapted to operatively couple the piston rod to the shell;

an elongated first piston having a base at one of its ends and a first piston head formed at its other end, said base being entrained within and bonded to said cup;

a second piston having an annular sleeve concentrically spaced from the periphery of said shell and a second piston head formed at one end of said sleeve about the base of said first piston bonded to said cup and said annular core; and

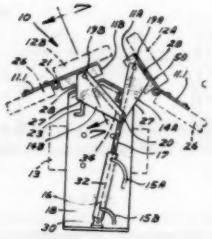
at least one spacer ring interposed and bonded between said shell and sleeve.

4,683,811

RIDGE VENTILATOR DOOR

Richard D. Huisinga, and Rayburn E. Norling, both of Willmar, Minn., assignors to Willmar Poultry Company, Inc., Willmar, Minn.

Filed Nov. 18, 1985, Ser. No. 798,993
Int. Cl.[4] F24F 7/02
U.S. Cl. 98—42.2 **10 Claims**



1. A ridge ventilating device for regulating air flow through a ridge passage in the roof of a building, which comprises:

(a) first and second elongate opposed door panels on parallel hinges for attachment to the roof of the building;

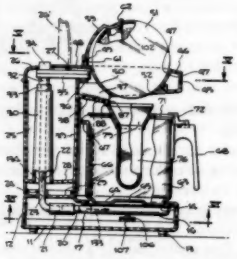
(b) an elongate actuating unit depending from the door panels and having a mounting pivot for attachment to the interior roof structure of the building, the elongate actuating unit having a pair of elongate upright connecting links with upper ends each pivotally connected to one of the doors, and with lower ends pivotally connected together by a common pivot by which upward thrust may be imparted to the links, the actuating unit having elongate extensible and retractable means with an upper end connected to said common pivot and a lower end connected to said mounting pivot to open and close said doors in response to extension and retraction of said extensible and retractable means.

4,683,812

TEA BREWER AND DISPENSER COMBINATION

Kenneth A. Tarlow, Playa del Rey, Calif., and Brad Ridgley, 16881 Oak View Dr., Encino, Calif. 91436, assignors to Brad Ridgley, Encino, Calif.

Filed May 23, 1986, Ser. No. 866,607
Int. Cl.[4] A47J 31/18, 31/40
U.S. Cl. 99—289 R **17 Claims**



1. A combination tea brewer and tea leaves dispenser comprising:

a housing having a bottom wall and a peripheral side wall with an opening in the side wall;

a heating plate disposed in said housing within said opening for receiving a carafe thereon;

a water tank within said housing having an outlet leading to a water pipe within said housing, said water pipe being disposed below said heating plate and adjacent thereto and having an outlet leading upwardly within said housing to a water spout;

said water spout opening into the interior of said opening in said side wall about said plate;

heating means engaging said water pipe for heating water flowing therethrough;

a tea dispenser retaining area in said housing above the opening in said side wall having an opening therethrough communcating with the interior of the opening in said side wall;

at least one tea dispenser disposed in said area adapted to contain tea leaves therein, said dispenser having an opening therethrough communicating with the interior of said dispenser; and;

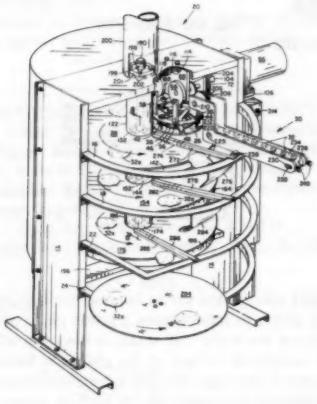
at least one dispenser opening closure member on said housing engaging said dispenser and normally closing off the opening in said dispenser whereby disengagement of said closure member from said opening in said dispenser opens the interior of said dispenser to the atmosphere.

4,683,813

SYNCHRONIZED PRESS FOR BAKERY PRODUCTS

George A. Schultz, 176 Ohio Ave., New Braunfels, Tex. 78130

Filed Oct. 21, 1985, Ser. No. 789,948
Int. Cl.[4] A47J 37/00
U.S. Cl. 99—353 **14 Claims**



1. Apparatus for forming a bakery product comprising:

a horizontal press plate revolving about a fixed horizontal axis whose horizontal component of motion is wholly linear;

a press disc for receiving portions of bakery product ingredients thereon rotatable at an angular speed about a substantially vertical axis; and

means for synchronizing movement of said press plate and said press disc whereby said press plate presses said portion of bakery product ingredients against said press disc and said horizontal component of motion of said press plate is substantially equivalent to said angular speed of said press disc when said press plate is pressing against said portion of bakery product ingredients.

4,683,814

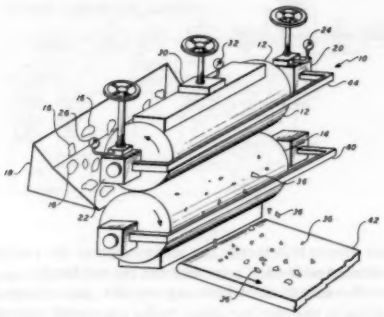
APPARATUS AND PROCESSES FOR COMPRESSING AND/OR BIODIGESTING MATERIAL

Charles J. Piovanich, Westernville; Guy H. Ossont; Keith C. King, both of Rome; Robert H. Irwin, Lafayette, all of N.Y., and Walter V. Knoop, Columbus, N.C., assignors to Revere Copper and Brass Incorporated, Rome, N.Y.

Continuation-in-part of Ser. No. 584,332, Feb. 28, 1984, abandoned. This application Oct. 28, 1985, Ser. No. 792,026

Int. Cl.[4] B30B *13/00, 9/20, 15/34*

U.S. Cl. 100—37 **37 Claims**



1. Apparatus for compressing moisture containing material, comprising:

rolling means including a pair of opposed rolls having smooth surfaces for receiving and advancing said material therebetween to apply predetermined rolling load thereto to compress said material and remove at least a portion of said moisture therefrom; and

differential means for causing one of said rolls to rotate at a predetermined lower speed than the rolling speed of the other of said rolls, said predetermined differential rolling speeds developing friction between the rolls causing the rolls to be heated and apply heat to said material to further remove moisture therefrom, to cause said compressed material to adhere to said one roll and to cause said removed moisture to adhere to said other roll.

4,683,815

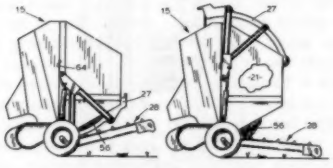
BALER MACHINE WITH A BALE TRANSFER CONVEYOR

Wilbur Van Ryswyk, Pella, Iowa, assignor to Vermeer Manufacturing Co., Pella, Iowa

Filed Apr. 26, 1985, Ser. No. 727,793

Int. Cl.[4] B30B *5/06, 15/32*

U.S. Cl. 100—88 **1 Claim**



1. In a crop baling machine for forming cylindrical bales comprising:

(a) a front frame section,

(b) a rear discharge section pivotally connected to said front section, and

(c) means for moving said rear section between a closed position to define a bale forming chamber with said front section, and an open position for discharge of a bale from said chamber, the improvement comprising:

(1) a pivoted bale conveyor unit on said front section projected below said rear discharge section and extended rearwardly therefrom,

(2) means pivotally supporting said conveyor unit on said front section for movement from a substantially horizontal bale receiving position to a downwardly and rearwardly inclined bale transfer position;

(3) means yieldably urging said conveyor unit to the bale receiving position therefor,

(4) transfer means on the conveyor unit for engaging a bale in the bale receiving position for movement rearwardly of the conveyor unit for discharge therefrom to a ground supported position rearwardly of said rear section, said conveyor unit pivotally movable against the action of said yieldable means to said bale transfer position by the weight of a bale thereon,

(5) means on said conveyor unit for driving said transfer means, and

(6) means responsive to the movement of the rear section for actuating the transfer driving means only for so long as the rear section is in the open position therefor.

4,683,816

DRUM PRESS

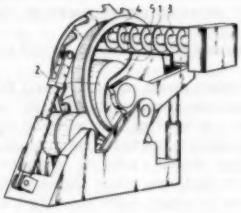
Jyrki Simanainen, Savonlinna, Finland, assignor to Enso-Gutzeit Oy, Helsinki, Finland

Filed Jun. 13, 1985, Ser. No. 744,228

Claims priority, application Finland, Jul. 12, 1984, 842805

Int. Cl.[4] B30B *9/20*

U.S. Cl. 100—121 **3 Claims**



1. In combination with a drum press including a rotating dewatering drum having an inner surface against which wet bark is pressed to effect dewatering of the wet bark and a press roll supported eccentrically within the dewatering drum for compressing the wet bark in a gap defined between the press roll outer surface and the inner surface of the dewatering drum, a screw assembly for removing the compressed, dewatered bark from the inner surface of the dewatering drum, comprising:

a first portion located within said dewatering drum adjacent the inner surface, and

a second portion extending coaxially with said first portion and laterally away from said inner surface,

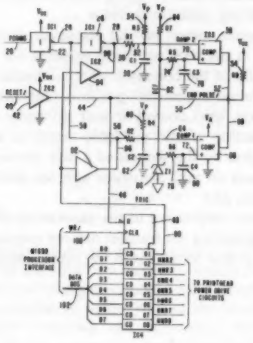
said first and second portions being separable from one another,

whereby said first portion can be removed from said drum press without having to remove the entire screw assembly.

4,683,817
DOT MATRIX PRINT HEAD ENERGY CONTROL CIRCUIT

James R. Del Signore, II, Trumansburg, N.Y., assignor to NCR Corporation, Dayton, Ohio

Filed May 20, 1986, Ser. No. 864,986
Int. Cl.[4] B41J 7/92, 9/38
U.S. Cl. 101—93.03 14 Claims



1. A control circuit for a plurality of impact print hammers utilized in printing on record media of one or another type wherein the required printing energy is different for said one and said another type record media, said circuit comprising

selection signal means settable to one of two signal levels thereof,

latch means for receiving data in accordance with information to be printed and having outputs connected to print hammer drive means, a

first RC network coupled to said latch means and responsive to the selection signal means at one level thereof,

inverter means coupled to said selection signal means and to said first RC network,

first comparator means coupled to said first RC network, a

second RC network coupled to said latch means and responsive to the selection signal means at the other level thereof,

second comparator means coupled to said second RC network, and

precision reference means coupled to said first and to said second comparator means, the first RC network being operated at one level of said selection signal means to provide one pulse width to the latch means for printing of said one type record media by operation of the latch means by the first comparator means when the value of the precision reference means is reached, and the second RC network being operated at another level of said selection signal means to provide another pulse width to the latch means for printing of said another type record media by operation of the latch means by the second comparator means when the value of the precision reference means is reached.

4,683,818
PRINT ELEMENT CONTROL

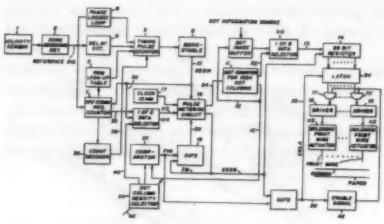
Clarence W. Hewlett, Jr., Waynesboro, Va., assignor to Genicom Corporation, Del.

Continuation of Ser. No. 675,176, Oct. 25, 1984, abandoned.
This application Mar. 26, 1986, Ser. No. 843,832
Int. Cl.[4] B41J 3/12
U.S. Cl. 101—93.04 11 Claims

1. A printing element control for causing dots to be selectively printed across a line of print on a print medium as a line of spaced-apart print elements execute a traversal across said line of print to print at least a major segment of only a single row of dots associated with said print elements, said print elements being spaced apart by n dot column position, said control comprising:

means for providing control signals which correspond to traversal positions of said print elements;

a dot line image data buffer means for storing in a consecutive address order all of the dot printing signals representing at least a major segment of a single dot line image to be printed, by said print elements, said segment spanning at least a plurality of the distances between said spaced-apart



print elements wherein the n dot column bit positions associated with each print element are not fixed;

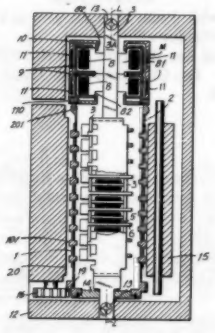
means for selectively addressing the Jth dot column bit position in said dot line image buffer associated with each spaced-apart printing element, where J=1 to n, for retrieving dot printing signals in corresponding dot column bit positions for each printing element, and

means responsive to said control signals and to said retrieved printing signals for causing said line of print elements to print said single dot line image during said traversal of said print elements in spatial sequence across said line of print.

4,683,819
COMPACT PRINTER WITH HAMMER STRUCTURE WITHIN TYPE DRUM

Hitoshi Mikoshiba, Shiojiri, Japan, assignor to Seiko Epson Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 26, 1985, Ser. No. 748,893
Claims priority, application Japan, Jun. 28, 1984, 59-133806; Jun. 28, 1984, 59-133807
Int. Cl.[4] B41J 9/02
U.S. Cl. 101—93.22 15 Claims



1. A compact printer comprising:

a frame;

a substantially cylindrical member having a plurality of type characters disposed on the surface of said member;

type printing means disposed within said cylindrical member

for selectively causing characters on said cylindrical member to print; and

an elongated yoke mounted on the frame having a first portion extending through the cylindrical member and a second portion extending past an end of the cylindrical member, the cylindrical member mounted on the first portion,

motor means for rotating said cylindrical member mounted on the second portion of the yoke, said motor means being directly coupled to said cylindrical member so that said cylindrical member rotates in unison with said motor means, said motor means being coaxial with and adjacent to said cylindrical member.

4,683,820

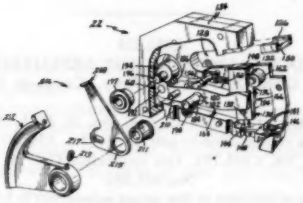
PRINTING MECHANISM

Thomas K. McGourty, and Lawrence F. McGourty, both of Pas Robles, Calif., assignors to Varitronic Systems, Inc., Eden Prairie, Minn.

Division of Ser. No. 608,050, Feb. 17, 1984, Pat. No. 4,579,056. This application Dec. 6, 1985, Ser. No. 809,792

Int. Cl.[4] B41J *9/28*

U.S. Cl. 101—93.36 **1 Claim**



1. An impact printing apparatus to transfer an impression of a character from a print disk to an image carrying tape with a color carrying film including a housing and a press having a first and second members relatively closeable toward each other, the members each having a planar surface which are brought toward each other during printing, said first member being rigidly affixed to said housing, said second member including a hammer having upper and lower ends and a drive lever, said planar surface of said second member being on said upper end of said hammer, said hammer having its planar surface generally parallel with the other planar surface and having four sides generally orthogonal to said planar surface, and said hammer being adjustably maintained in this position by fixed guide means adjacent said upper end and adjustable guide means affixed to said first member and engaging said hammer adjacent its lower end and, said lower end being slideably received within said adjustable guide means, said adjustable guide means including a plate with at least one slotted aperture therein and wherein said fixed guide means includes a roller affixed to said housing with its outer surface in contact with said hamamer adjacent said upper end so that movement of said adjustable guide means will cause pivotal movement of said hammer at said fixed guide means and permit alignment of said planar surfaces.

4,683,821

PROCESS FOR MULTI-COLOR INK TAMPON PRINTING

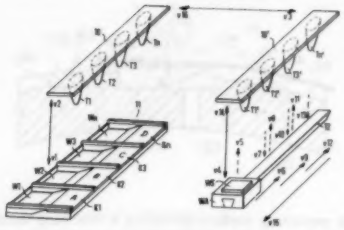
Bernd Berberich, Schwieberdingen, Fed. Rep. of Germany, assignor to TAMPOflex GmbH, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,488

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1984, 3436688

Int. Cl.[4] B41F *1/10, 1/16*

U.S. Cl. 101—170 **20 Claims**



1. A process for multicolor ink tampon printing of the type wherein a plurality of ink tampons are aligned next to one another on a support means, a plurality of printing forms are aligned on a plurality of printing blocks, a work piece to be printed is mounted on a work piece holder, and said support means with said aligned ink tampons is movable with respect to said printing blocks and said work piece holder, said process comprising: simultaneously transferring each said printing form (A–D) from each said printing block (K1–Kn) to one said ink tampon (T1–Tn) by moving said support means with respect to said printing blocks to contact each said ink tampon to one said printing block and release said ink tampons; simultaneously locating said support means with said aligned ink tampons and said work piece holder (T1–Tn) in a first printing position (T1') wherein a first ink tampon is positioned above said work piece and transferring said printing form from said first ink tampon to said work piece by moving said support means with respect to said work piece holder in a first printing stroke to contact said first ink tampon to said work piece and a first reset stroke to release said first ink tampon from said work piece; and sequentially moving said work piece holder with respect to said support means to locate said aligned ink tampons in successive printing positions with respect to said work piece and successive printing strokes transferring each said printing form from each said ink tampon to said work piece by successive printing strokes contacting each said ink tampon to said work piece and reset strokes releasing each said ink tampon, said trnsferring said printing forms from said printing blocks to said work piece comprising a printing cycle.

4,683,822

DIE MOUNTING APPARATUS

Louis M. Sardella; John B. West, both of Cockeysville; John R. Harrison, Baltimore, all of Md., and Dennis J. Parr, York, Pa., assignors to The Ward Machinery Company, Cockeysville, Md.

Filed Sep. 17, 1985, Ser. No. 776,775

Int. Cl.[4] B41F *27/06*

U.S. Cl. 101—382 MV **20 Claims**

1. Die mounting apparatus, comprising:

a die mounting surface for holding a die;

suction means in said surface for applying subatmospheric pressure to the bottom surface of a die on said surface to hold said die firmly against said surface;

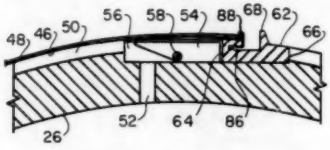
said suction means including a plurality of laterally spaced recesses in said surface from which said subatmospheric pressure is applied to said bottom surface of said die;

said recesses each including a valve means therein, each of

said valve means being operable to direct said subatmospheric pressure to said bottom surface, upon placement of said die upon said die mounting surface and over said valve means, to direct said subatmospheric pressure from only those recesses covered by said die;

said die mounting surface comprising an annular rotatable cylinder;

said suction means including a plurality of laterally spaced annular grooves in said die mounting surface each of which is in communication with one of said laterally spaced recesses for directing said subatmospheric pressure in said recesses to said bottom surface of said die;



said die mounting surface including a first stop means, extending transverse to the direction of said annular grooves and across an end of each of said recesses, for closing such ends to the flow of said subatmospheric pressure;

said die mounting surface including a second stop means, extending transverse to the direction of said grooves and across said grooves at a location spaced from said first stop means, for closing said grooves to said subatmospheric pressure so that, together with said valve means covered by said die, said subatmospheric pressure is applied only beneath said die; and

said second stop means being selectively operable to direct subatmospheric pressure along portions of said grooves extending beyond said second stop means.

4,683,823

SAFETY DEVICE FOR A PROJECTILE FUSE

Horst Dinger, Tennenbronn, and Horst Moosmann, Schramberg, both of Fed. Rep. of Germany, assignors to Gebruder Junghans GmbH, Schramberg, Fed. Rep. of Germany

Filed May 21, 1986, Ser. No. 865,438

Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519517

Int. Cl.[4] F42C *15/00, 15/26*

U.S. Cl. 102—229 **4 Claims**

1. A fuse for a projectile, such as a rocket, comprising:

a rotor rotatable from a safety position to a live position,

a rotor spring operably connected to said rotor for rotating said rotor to said live position when said rotor spring is tensioned,

a rotatable wheel operably connected to said rotor spring for tensioning said rotor spring,

a rotatable toothed element operably connected to said wheel for rotating said wheel to tension said rotor spring,

a movable arm operably connected to said toothed element for rotating the latter, and

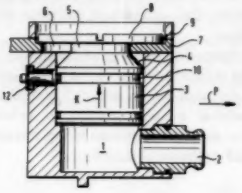
means for rotating said arm comprising:

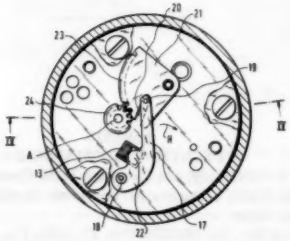
a ram pressure piston movable in a direction transverse relative to a direction of firing of the projectile,

means communicating said piston with ram prssure for urging said piston in said transverse direction when the projectile is fired,

a spring-loaded bolt biased in said direction of firing into locking relationship with said piston, such that said bolt releases said piston for transverse movement in response to firing of the projectile, and

a movable member including a locking portion releasably engaging said rotor to prevent said rotor from rotating, said member being operably connected to said piston to be displaced by said piston, in response to transverse movement of the latter, in a manner moving said member to an unlocking position in which said locking portion releases said rotor, said member being operably connected to said arm for moving the latter to rotate said toothed element in response to movement of said





member to its unlocking position whereby said toothed element rotates said wheel to tension said rotor spring, and said tensioned rotor spring rotates said rotor to its live position.

4,683,824

CARTRIDGE LAUNCHED - DISK DEPLOYED CHAFF

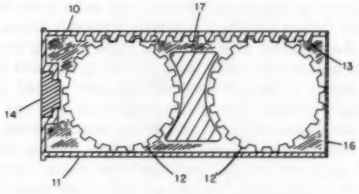
Robert L. Gibbs, 2255 Winter Pkwy., Cuyahoga Falls, Ohio 44221

Continuation of Ser. No. 451,014, Jan. 26, 1983, abandoned, which is a continuation-in-part of Ser. No. 334,597, Dec. 28, 1981, Pat. No. 4,446,793. This application Oct. 29, 1984, Ser. No. 665,502

The portion of the term of this patent subsequent to May 8, 2001, has been disclaimed.

Int. Cl.[4] F42B *13/42, 5/16*

U.S. Cl. 102—436 **9 Claims**



1. A spin stabilized disk having an axis of rotation which is perpendicular to its line-of-travel upon being ejected from a launching device to release a payload of radiation interference material comprises:

a substantially cylindrical disk case having a closed end, an open end, and a plurality of gear teeth about at least a portion of its external circumferential surface which teeth effect imparting of rotational forces to the disk case upon being launched;

a payload of radiation interference material within the disk case; and

payload ejection means positioned within the disk case between the closed end and the payload to effect ejection of the payload upon the disk being launched

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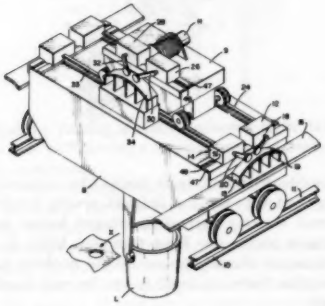
4,683,825

ANALOG CAM PROFILE SENSOR SYSTEM

I. Moskowitz, Baltimore, Md., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Sep. 9, 1985, Ser. No. 773,619
Int. Cl.[4] B61B *3/00*
U.S. Cl. 105—148 **20 Claims**



1. An apparatus for positioning a ladle relative to a pouring location, comprising:

(a) a crane bridge assembly movable along a crane bridge trackway in a first direction and including a hoist trolley assembly movable along said crane bridge assembly in a second direction transverse to said first direction and carrying a ladle;

(b) a first contoured cam position proximate said crane bridge assembly and being associated with a pouring location;

(c) first sensor means mounted to said crane bridge assembly and movable therewith and including first cam follower means engageable with said first cam and generating a signal indicative of engagement with and the position of said first sensor means along said first cam;

(d) crane bridge position indicating means connected with said first sensor means including means responsive to the generated signal for determining and indicating the position of said crane bridge assembly relative to the pouring location;

(e) a second contoured cam positioned on said crane bridge assembly proximate said hoist trolley assembly and being associated with the pouring location;

(f) second sensor means mounted to said hoist trolley assembly and movable therewith and including second cam follower means engageable with said second cam and generating a signal indicative of engagement with and the position of said second sensor means along said second cam; and,

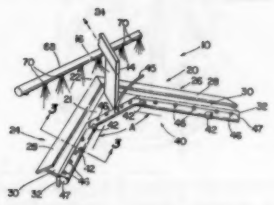
(g) hoist trolley position indicating means connected with said second sensor means and including means responsive to the generated signal for determining and indicating the position of said hoist trolley assembly relative to the pouring location.

4,683,826

SUBSURFACE APPLICATION OF CHEMICALS

John B. Solie, Stillwater, Okla.; Howard D. Wittmuss, Lincoln, Nebr., and Orvin C. Burnside, St. Paul, Minn., assignors to The Board of Regents of the University of Nebraska, Lincoln, Nebr.

Continuation-in-part of Ser. No. 356,447, Mar. 9, 1982. This application Apr. 15, 1985, Ser. No. 723,914
Int. Cl.[4] A01C *23/02*
U.S. Cl. 111—7 **4 Claims**



1. A method comprising the steps of:

forcing a horizontally elongated implement having two trailing wings joined at a forward end with the trailing wings being at an angle to each other of between 60 degrees or greater and being spread no less than 51 centimeters from each other at their trailing ends horizontally through the soil in a first direction at a depth sufficient to break up the subsurface without inverting the surface and no deeper than eight centimeters;

injecting chemicals in a jet under pressure substantially vertically upwardly from a location adjacent to the rear of the subsurface implement at a number of locations spaced from each other horizontally between two and four centimeters in a second direction at an angle to the first direction;

the step of injecting includes the step of injecting through nozzles having narrow openings spaced approximately 2 to 4 centimeters from each other;

said step of forcing including the step of forcing a standard for the implement including a plate connected at its bottom end to the implement and adapted to be connected at its top end to a vehicle, the plate having a dimension transverse to the implement that is no more than 5 percent the distance apart of the trailing ends of the implement;

said step of forcing further including the step of moving the jets through a sufficient amount of soil at a pressure of application and speed of movement of the jet to form a treated layer of soil containing more than four gallons of chemicals for each acre in which the chemicals are incorporated and one gallon of said chemicals incorporated in soil for at least 67 cubic yards of soil; and

the step of injecting including the step of injecting under a pressure sufficient so that for a given porosity of soil and moisture content, enough fluid penetrates the soil from one nozzle to provide a volume of soil wet with the chemical to extend at least two inches high and 0.5 inches wide with a forward velocity of the implement of at least four miles per hour.

4,683,827

MOVEMENT CONTROL APPARATUS FOR SEWING MACHINE

Tomoaki Kinoshita, Kanagawa; Kunio Takano, Tokyo; Yoichi Okiyama, Kanagawa, and Osamu Tachikawa, Tokyo, all of Japan, assignors to Tokyo Juki Industrial Co., Ltd., Chofu, Japan

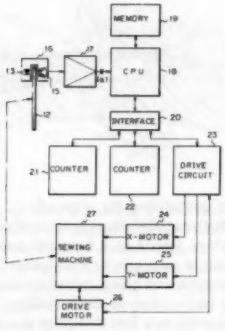
Filed Jul. 24, 1985, Ser. No. 758,655
Claims priority, application Japan, Jul. 31, 1984, 59-160777
Int. Cl.[4] D05B *21/00*
U.S. Cl. 112—121.12 **4 Claims**

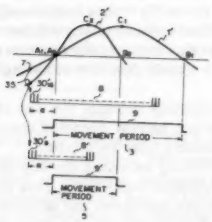
1. A movement control apparatus for a sewing machine

which previously stores sewing pattern data and drives a work holder by pulse motors to move a workpiece in accordance with the sewing pattern data in synchronization with the sewing machine speed, said apparatus comprising:

(a) pulse generating means for generating at least two sewing machine speed pulses synchronized with the sewing machine speed and for generating drive pulses;

(b) memory means for storing movement control values corresponding to various sewing machine speeds as a plurality of numbers of drive pulses from said pulse generating means;





(c) movement control means for controlling input timing of the drive pulses to the pulse motor to correspond to sewing machine speeds with an intrinsic delay time, said intrinsic delay time being the time from inputting the drive pulses to the pulse motors until the pulse motors are driven;

(d) detecting means for detecting sewing machine speed from the sewing machine speed pulses; and

(e) control means for reading the value corresponding to output of said detecting means and utilizing a portion of the drive pulses corresponding to one of the movement control values as input timing regulating pulses.

4,683,828

ORNAMENTAL THREAD AUTOMATIC CUTTING DEVICE OF FLAT PLURAL-NEEDLES SEWING MACHINE

Takeshi Matsumoto, Osaka, Japan, assignor to Yamato Mishin Seizo Kabushiki Kaisha, Osaka, Japan

Filed Aug. 26, 1985, Ser. No. 769,334
Int. Cl.[4] D05B *65/14*
U.S. Cl. 112—294 **4 Claims**

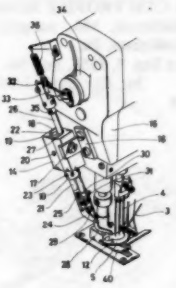
1. An automatic ornamental thread cutting device for cutting ornamental thread stretched between a finished sewing portion and a thread hooking part of a thread looper of a plural-needle sewing machine, said device comprising:

a knife guide holer mounted to the sewing machine above the thread looper;

a knife guide extending through said knife guide holder;

a fixed trimming knife shaft extending through said knife guide toward the thread looper, and a fixed trimming knife attached to a bottom end of said fixed trimming knife shaft above the thread looper;

a movable trimming knife shaft slidingly guided and extending through said knife guide, a movable trimming knife attached tdo a bottom end of said movable trimming knife shaft, said movable trimming knife having a hooked edge, said movable trimming knife slidable in said knife guide between a first position in which said hooked edge of said



movable trimming knife hooks the ornamental thread stretched between the finished sewing portion and the thread hooking part of the thread looper to a second position above the fixed trimming knife at which the ornamental thread hooked by the hooking edge of said movable trimming knife is cut by said fixed trimming knife;

adjusting means for setting and for adjusting said first and second positions relative to said knife guide; and

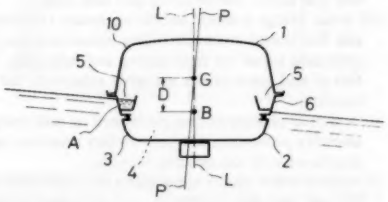
shaft moving means for reciprocating said movable knife trimming shaft, the movement of which is limited between said first and second positions by said adjusting means.

4,683,829

SMALL SELF-RIGHTING WATER CRAFT

Hiroshi Nishida, Miki, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Oct. 17, 1985, Ser. No. 788,641
Claims priority, application Japan, Oct. 29, 1984, 59-227276
Int. Cl.[4] B63B *39/03*
U.S. Cl. 114—125 **5 Claims**



1. A self-righting water craft comprising a hull, a substantially enclosed engine room in said hull a reverse bilge well provided in both left and right side portions in said engine room, and a means for moving and flowing a bilge water in a bottom of the water craft into either said bilge well when said water craft is overturned to increase a force couple, which is produced by the weight and buoyancy of said water craft in the direction to right said water craft to normal upright posi-

tion by means of a deviation of the bilge water, thereby accelerating the self righting of said water craft.

4,683,830

SHIP'S STEERING SYSTEMS

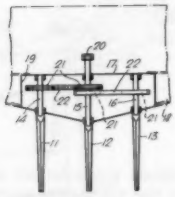
Ewan C. B. Corlett, Port'e Vullen, Isle of Man, assignor to Hydroconic Limited, England

Continuation of Ser. No. 660,405, Oct. 12, 1984, abandoned, which is a continuation of Ser. No. 382,013, May 25, 1982, abandoned. This application Nov. 21, 1985, Ser. No. 800,361

Claims priority, application United Kingdom, May 29, 1981, 8116570

Int. Cl.⁴ B63H *25/06*

U.S. Cl. 114—163 **3 Claims**



1. A modular rudder assembly, adapted to be fastened to non-metal boat hulls having a recessed area and with unducted propellers, comprising:

a unitary box complementary to and adapted to be removably secured to the boat hull recess, said box having enclosing side, top and bottom walls;

an athwartships row of at least three rotatable rudder stocks having lower portions extending below said bottom wall and upper portions extending above the bottom wall and into the interior of said box at least one of said rudder stocks also extending through and projecting above said top wall of said box, the lower portions of said rudder stocks extending below the bottom wall of said box being cantilevered in that they are unsupported at their bottom ends;

bearings on said box in which the upper portions of said rudder stocks are journalled for rotation;

at least three rudder blades situated underneath said box and arranged as a cascade, each rudder blade being mounted on the lower portion of a respective one of said rudder stocks and being made as a one-piece molding of synthetic plastic material

at least three gears in the interior of said box, one each affixed to each of said stocks said stocks and each having a cross-sectional area substantially greater than that of each of said stocks, and each gear having a plurality of teeth along its peripheral annular surface;

cogged belts having teeth complementary to and adapted to engage said gear teeth, one belt extending between and around at least two of said gears; and

a pivotal main tiller arm above said box secured to the rudder stock that projects above said top wall

where upon pivoting, said main tiller arm pivots said rudder stock and gear affixed thereto, imparting through said belt, gears, rudder stock and rudder blades an equal amount of rotational force thereby causing said blades to rotate in a substantially equivalent manner.

4,683,831

LINE FASTENING UNIT

Lorn O. Shaffner, 12383 Arrowhead Ct., Eastport, Mich. 49627

Filed Jun. 28, 1985, Ser. No. 749,659

Int. Cl.⁴ F16B *39/02*

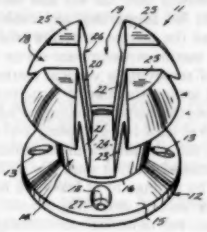
U.S. Cl. 114—218 **4 Claims**

1. A line fastening unit comprising:

a mounting base;

a neck portion connected to said base and rising therefrom with a gradual up-flaring taper;

a knob-like cap structure surmounting said neck portion and forming, at intersection of cap and neck, an angled



groove, said cap and neck portions having two downward tapering wedge-shaped channel openings transverse to each other and through the principal axis of said cap and neck.

4,683,832

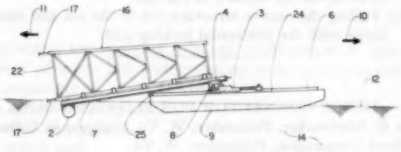
DEVICE AND METHOD TO SET AND SALVAGE STRUCTURES

Edward D. Dysarz, 11423 Triola La., Houston, Tex. 77072

Filed Jul. 30, 1984, Ser. No. 636,102

Int. Cl.⁴ E02D *25/00*

U.S. Cl. 114—258 **7 Claims**



1. A mobile offshore construction device for use in transporting a marine structure in a substantially horizontal position on a barge and setting the marine structure in a vertical position on the sea floor, comprising:

a barge, said barge having means for floating said barge on the surface of the sea;

at least one rail on said barge, said rail lying in a fore and aft direction on the deck of said barge;

a horizontal jacking unit having means for propelling said horizontal jacking unit on said rail in a fore and aft direction substantially along the entire length of said barge;

an inclined jacking unit including hinges, said hinges rotatably connecting said inclined jacking unit to said horizontal jacking unit, whereby said inclined jacking unit rotates in a forward to aft direction;

a grappling arm substantially as long as said barge in the fore and aft direction, said grappling arm slidably attached to said inclined jacking unit;

means for temporarily locking said grappling arm slidably to the marine structure;

at least one buoyancy tank connected to one end of said grappling arm;

means for moving said grappling arm off of said barge to a position fully extended aft of said barge and supported at a first end by said barge and at a second end by said buoyancy tank;

said buoyancy tank having sufficient buoyancy to support part of said grappling arm and part of the marine structure;

said buoyancy tank having means for allowing air to escape, whereby said buoyancy tank becomes only partially buoyant to allow said grappling arm and the marine structure to descend slowly into the sea and said buoyancy tank having means for supporting and cushioning said grappling arm and the marine structure when said grappling arm and the marine structure are set on the sea floor.

2. A method of removing a vertical marine structure from the sea floor and setting the marine structure on a barge in a horizontal position, the barge including at least one buoyancy tank connected to at least one grappling arm equipped with at least one grapple, the grappling arm being movably connected to at least one inclined jacking unit, the inclined jacking unit being connected by a hinge to at least one horizontal jacking unit, the horizontal jacking unit being movably connected to at least one horizontal rail mounted substantially along the entire length of the deck of the barge, comprising the steps of:

A. Extending the grappling arm fully behind the barge such that it is supported on the sea surface at one end of the grappling arm by the buoyancy tank and at the other end of the grappling arm by the barge with substantially the entire length of the grappling arm over the surface of the sea;

B. Lowering the grappling arm by the buoyancy tank to the sea floor;

C. Locating the grappling arm near the marine structure;

D. Placing the grapples around a structural member of the marine structure;

E. Pulling the marine structure over at an angle;

F. Filling the buoyancy tank with air to allow the buoyancy tank to raise itself, the grappling arm and the marine structure to the surface of the sea;

G. Pulling the marine structure out of the sea and onto the barge with the horizontal jacking unit.

4,683,833

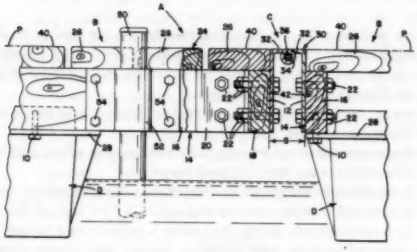
HINGE CONNECTOR FOR FLOATING DOCK

Jon D. Meriwether, Follansbee, W. Va., assignor to Follansbee Steel Corporation, Follansbee, W. Va.

Filed May 5, 1986, Ser. No. 859,922

Int. Cl.[4] B63B *35/00, 35/36*

U.S. Cl. 114—267 **20 Claims**



1. A hinge connector for pivotally interconnecting a pair of floating dock sections in adjoining spaced relation, said hinge connector comprising a pair of elongated metal hinge leafs pivotally interconnected by a hinge pin extending through aligned hinge loops on said hinge leafs located along respective ones of the longitudinal edges thereof, said hinge connector being adapted for securing to adjoining spaced side portions of said dock sections with the said hinge pin extending horizontally, and lengthwise and medially of the spacing between said adjoining side portions of the dock sections, and with the said hinge leafs horizontally bridging and closing the gap between the said spaced side portions of the dock sections at approximately the level of the deck surfaces thereof to effectively form a continuation of the said deck surfaces, the said secured hinge connector pivotally interconnecting said dock sections for vertical pivoting movement both upwardly and downwardly about the said hinge pin through an appreciable angle.

4,683,834

WIRE CHAIN CONNECTOR

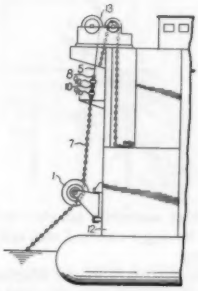
Masashi Fujimoto, and Kazuo Okazaki, both of Shimonoseki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 19, 1986, Ser. No. 830,882

Claims priority, application Japan, Apr. 30, 1985, 60-91034

Int. Cl.[4] F16G *15/08*

U.S. Cl. 114—294 **5 Claims**



1. A connector for an anchor line for connecting a wire rope to a chain and adapted to pass along a connector groove formed in the outer part of a peripheral groove in a sheave, the rope being adapted to pass along a wire rope groove in the inner surface of the peripheral groove of the sheave, and the chain being adapted to pass along a chain pocket formed in the central portion of the peripheral groove in the sheave, said connector comprising:

a rope socket for mounting on one end of the wire rope;

a chain link linked to said rope socket;

a swivel connected to said link and having a body with a size for being seated in the connector groove in the sheave when the anchor line passes over the sheave; and

a ball adapter mounted on the outer periphery of said link and having substantially the same size as said swivel body for being seated in the connector groove in the sheave at substantially the same radial distance from the center of said sheave as is said swivel body.

4,683,835

LABELING STATION FOR BOTTLES OR THE LIKE

Hermann Kronseder, Regensburger Str. 42, 8404 Worth/Donau, Fed. Rep. of Germany

Filed Apr. 28, 1986, Ser. No. 856,831

Claims priority, application Fed. Rep. of Germany, May 2, 1985, 3515675

Int. Cl.[4] B05C *1/02*

U.S. Cl. 118—231 **13 Claims**

1. A device for applying glue to labels for containers such as bottles, comprising:

a gear box;

a rotor and a rotationally driven rotor shaft projecting from said gear box to which shaft said rotor is mounted for rotation,

at least one pick-off element mounted to said rotor for picking off a label when coated with glue, said element moving in a circular path with said rotor,

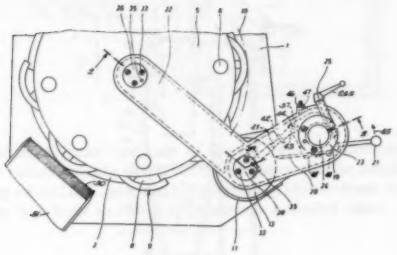
a stationary support member mounted to said gear box and laterally spaced from said rotor,

a glue roller arranged between said rotor and said support

member for being contacted by said pick-off element, the rotational axis of said glue roller being parallel to the axis of said rotor shaft,

a glue scraper mounted to said stationary support member for swinging toward and away from said glue roller about an axis that is parallel to the axes of said rotor and roller,

a rotationally driven glue roller drive shaft projecting from said gear box and coupled to said glue roller coaxially with said roller,



arm means and means for releasably clamping said arm means to said stationary support for said arm means to extend over said rotor shaft and said glue roller remotely from said gear box,

means for making a rotatable and separable connection between the end of said glue roller most remote from said gear box and said arm means, and

means for making a rotatable and separable connection between said arm means and said rotor at said end of the rotor shaft most remmote form said gear box.

4,683,836

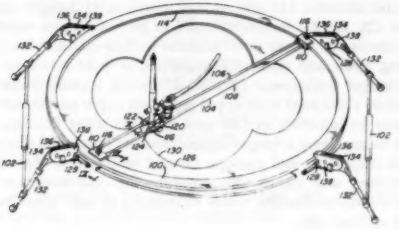
AIRBRUSH GUIDANCE SYSTEM

Peter West, Box 386, Claysville, Pa. 15323

Continuation-in-part of Ser. No. 727,752, Apr. 26, 1985, abandoned. This application Jan. 7, 1986, Ser. No. 816,726

Int. Cl.[4] B05B *15/06, 15/08*

U.S. Cl. 118—305 **11 Claims**



1. An apparatus for supporting and guiding an airbrush or similar instrument in spaced relationship with respect to a workpiece surface comprising:

a circular hoop means which is adapted to be supported in stationary relationship with respect to such a workpiece surface;

a rigid crossbar means extending diametrically of said hoop means and being supported thereby for free rotary movement with repect to said hoop means;

said crossbar means including an instrument holder means which is carried thereby and selectively movable with respect thereto and is adapted to retain such an instrument in a selectively adjustable angular orientation with respect to such a workpiece surface;

at least one of said

hoop means, said crossbar means and said instrument holder means including adjustable means for selectively varying the standoff distance of such an instrument from the workpiece surface; and

said crossbar means being cooperable with said hoop means to support such an instrument in a manner to permit free movement of the instrument over such a surface at a predetermined standoff distance and simultaneous variation of the angular orientation of the instrument with respect to such a surface.

4,683,837

APPARATUS FOR APPLYING A MIXED COMBINATION OF ADHESIVE AND RESIN TO CORRUGATED BOARD

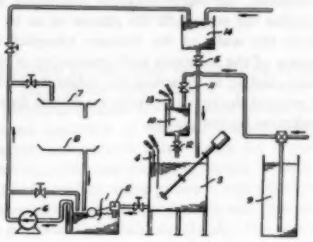
Kaljo Linke, Carlingford, and Raymond B. Neale, Loftus, both of Australia, assignors to N. B. Love Industries Pty. Limited, New South Wales, Australia

Filed Apr. 30, 1986, Ser. No. 858,459

Claims priority, application Australia, May 7, 1985, PH0459

Int. Cl.[4] B05C *11/00*

U.S. Cl. 118—612 **2 Claims**



1. Apparatus for applying a mixed combination of non-waterproof adhesive and waterproofing resin to corrugated board comprising:

(a) an adhesive storage tank;

(b) a resin storage tank;

(c) a mixing tank;

(d) a sump;

(e) a high/low level probe in said mixing tank controlling a valve for regulating the quantity of adhesive from said adhesive storage tank into said mixing tank;

(f) a second high/low level probe in said resin storage tank controlling a valve for regulating the quantity of resin from said resin storage tank into said mixing tank whereby a predetermined quantity of resin is initially added to said mixing tank and a smaller quantity is continuously added thereafter and

(g) means to deliver a portion of combined adhesive and resin to corrugated board and

(h) means to return any unused portion thereof to said mixing tank or said sump.

4,683,838

PLASMA TREATMENT SYSTEM

Shin-Ichiro Kimura, Hachioji; Eiichi Murakami, Kokubunji; Terunori Warabisako, Tokyo; Kiyoshi Miyake, Kanagawa, and Hideo Sunami, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

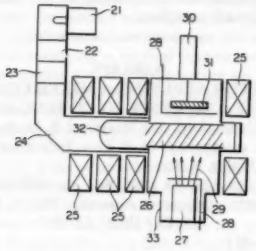
Filed Jul. 1, 1985, Ser. No. 750,474

Int. Cl.[4] C23C *16/00*

U.S. Cl. 118—715 **13 Claims**

1. A plasma treatment apparatus for treating a substrate with a plasma, which comprises a magnetron for generating a microwave, a discharge tube for having a plasma generated therein, a wave guide for leading the microwave from the magnetron to the discharge tube, whereby the microwaves are used to generate the plasma, a vacuum chamber, an evapora-

tion source provided in the vacuum chamber, to provide vaporized metal or alloy, a substrate holder for holding a substrate to be treated, the substrate holder being provided at a position to sandwich a stream of the plasma between the substrate and the evaporation source, in the vacuum chamber and electromagnets provided around the discharge tube and the



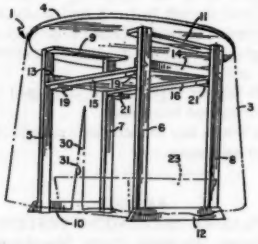
vacuum chamber, the electromagnets generating a magnetic field to confine the stream of the plasma so as to isolate the plasma from the walls of the vacuum chamber to prevent contamination of the substrate with sputtering of the walls of the chamber, and so as to isolate the substrate itself from the plasma to prevent the substrate from irradiation damage due to direct irradiation by the plasma.

4,683,839

COMBINATION OF A TABLE AND EQUIPMENT FOR CAT LITTER

Richard G. Uhrick, 4102 Glenview Ct., Fort Wayne, Ind. 46815

Filed May 13, 1985, Ser. No. 733,602
Int. Cl.[4] A01K *23/00*
U.S. Cl. 119—1 **18 Claims**



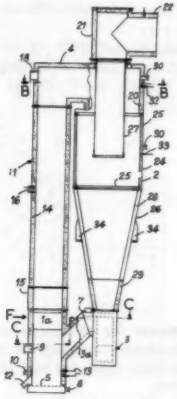
1. In combination: a table having a top and framework comprising a compartment and legs defining an unobstructed central area and equipment for cat litter comprising a bag supported substantially in said central area for receiving a receptacle adapted to contain litter and provided with an opening affording access to such a receptacle, and a tablecloth mounted on said top serving to conceal said table and equipment, said tablecloth having a wall of which at least a portion thereof can be moved aside by a cat to provide an entrance to said opening and will automatically close the entrance after a cat travels either way therethrough.

4,683,840

BOILER WITH A CIRCULATING FLUIDIZED BED

Jean-Xavier Morin, Neuville aux Bois, France, assignor to Framatome, Courbevoie, France

Filed Sep. 5, 1986, Ser. No. 905,094
Claims priority, application France, Sep. 9, 1985, 8513355
Int. Cl.[4] F22B *1/00*; F23C *11/02*
U.S. Cl. 122—4 D **7 Claims**



1. A boiler with a circulating fluidized bed utilizing the heat produced by the combustion of circulating materials and comprising an elongate fluidization chamber (1) with a vertical axis and with its inner surface entirely lined with a layer of refractory material (14), at the base of which boiler a combustible material and, if appropriate, a non-combustible solid material are introduced in the form of particles together with an oxidizing gas for suspending solid materials traveling upwards in said chamber (1), at least one recirculation cyclone (2) with a vertical axis, communicating with the upper part of said chamber (1) via a duct (4) substantially tangential to said cyclone (2), a second duct (3) for recycling solid materials placing the lower part of said cyclone (2) in communication with the lower part of said chamber (1), and at least one heat-exchanger component (25, 26, 27) in which water to be heated and vaporized circulates and whose outer transfer surface contacts hot circulating gases and said solid materials, at least one said heat-exchanger component (25, 26, 27) being located inside said cyclone (2) at least in its upper part, said upper part comprising means for injecting air (30) into said circulating fluidized bed, said means being arranged in substantially tangential directions with respect to said cyclone (2) and in stages in the vertical direction, said means (30) ensuring the combustion of said gases and combustible solids circulating in said upper part of said cyclone (2).

4,683,841

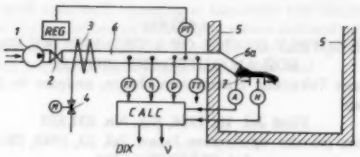
CONTROL OF A BLACK LIQUOR RECOVERY BOILER

Susanne Andersson, Enebyberg; Jan-Erik Gustafsson, Täby; Torbjörn Herngren, Alvsjö, and Staffan Carlsson, Mönsterås; Gunnar Hage, Västerås, all of Sweden, assignors to Svenska Träforskningsinstitutet, Stockholm; Södra Skogsägarna AB—Mönsterås Bruk, Mönsterås and ASEA Aktiebolag, Västerås, all of, Sweden

Filed Mar. 6, 1986, Ser. No. 836,559
Claims priority, application Sweden, Mar. 8, 1985, 8501137
Int. Cl.[4] F22B *31/04*; D21C *11/12*
U.S. Cl. 122—22 **16 Claims**

1. A method for controlling the combustion and reduction processes occurring in a black liquor (B.L.) recovery boiler by influencing the feeding of the black liquor in a layer form into the B.L. recovery boiler by means of a B.L. gun, said B.L. gun includes a lip which has a certain shape and length and which

provides an opening area for said B.L. gun, said method including the steps of (1) determining a value for the average thickness of the B.L. layer immediately downstream of the B.L. gun, by sensing the viscosity, the density and the flow rate



of the black liquor upstream of the B.L. gun and comparing these values with the shape, the opening area and the length of the lip of said B.L. gun, and (2) controlling the thickness value of the B.L. layer so that it approximates a desired value.

4,683,842

APPARATUS FOR DRYING WET STEAM AND SUBSEQUENTLY SUPERHEATING THE DRIED STEAM

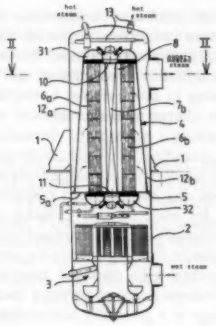
Günter Keintzel, Engelskirchen, and Klaus Westebbe, Gummersbach, both of Fed. Rep. of Germany, assignors to L. & C. Steinmüller GmbH, Gummersbach, Fed. Rep. of Germany

Filed Aug. 18, 1986, Ser. No. 897,401

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1985, 3531054

Int. Cl.⁴ F22G *4/00*

U.S. Cl. 122—483 **9 Claims**



1. An apparatus for drying wet steam and subsequently superheating the dried steam, comprising:

a cylindrical tank;

a separator disposed in said tank for receiving wet steam and removing water therefrom;

a superheater disposed in said tank for receiving dry steam from said separator; said superheater is provided with a plurality of tube bundles, some of which are part of a first superheating stage, with the rest being part of a second superheating stage; said tube bundles extend in the longitudinal direction of said tank, and form a channel in the center of said tank; and

deflector means that are disposed in said tank outwardly of said tube bundles; said deflector means extend in the longitudinal direction of said tank, and are associated with said tube bundles in such a way that dry steam from said separator flows, from the outside, inwardly through the tube bundles of said first superheating stage and into said central channel, and from there, from the inside, outwardly through the tube bundles of said second superheating stage.

4,683,843

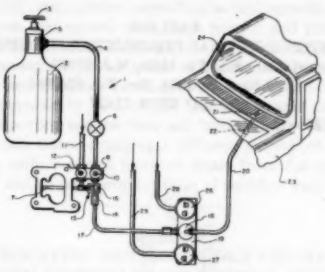
NITROUS OXIDE FUEL INJECTION SAFETY SYSTEM

John A. Norcia; William M. Wheatley, and Michael D. Norcia, all of Columbia, S.C., assignors to Ram Automotive Company, Columbia, S.C.

Filed Aug. 13, 1986, Ser. No. 896,055

Int. Cl.⁴ F02B *75/12*

U.S. Cl. 123—1 A **17 Claims**



1. An improved nitrous oxide fuel charging system for the engine of a high performance vehicle of the type having a supply of pressurized liquid nitrous oxide, means for spraying predetermined quantities of fuel and nitrous oxide into the vehicle engine, and control valve means for controlling the flow of nitrous oxide into the spray means, wherein said improvement includes first valve means communicating with the control valve means; and means placing said first valve means in an open position when the control valve means is in a closed position for venting any nitrous oxide to the atmosphere which leaks past the control valve means when said control valve means is in the closed position, and for placing said first valve means in a closed position when the control valve means is in an open position to block the flow of nitrous oxide to the atmosphere.

4,683,844

CYLINDER BLOCK AND HEAD ASSEMBLY FOR INTERNAL COMBUSTION ENGINES

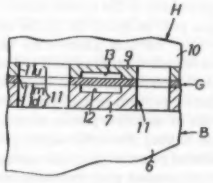
Takeo Arai; Nobuo Anno; Yusuke Kinoshita, and Yukio Kusakabe, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 11, 1985, Ser. No. 807,868

Claims priority, application Japan, Dec. 11, 1984, 59-261642; Dec. 29, 1984, 59-279651

Int. Cl.⁴ F01P *3/02*

U.S. Cl. 123—41.74 **13 Claims**



1. A cylinder block and head assembly for use in an internal combustion engine, comprising:

a closed-deck cylinder block having a deck and a first fluid chamber;

a cylinder head disposed on said deck and having a second fluid chamber;

a gasket interpose between said cylinder block and said cylinder head;

communication passages defined in said cylinder block, said cylinder head, and said gasket for providing communication between said fluid chambers; and

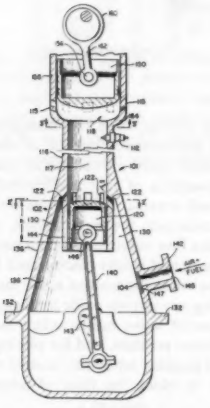
means defining recesses adjacent to said communication passages and between said cylinder block and said cylinder head for increasing the pressure on the surfaces of said gasket between said cylinder block and said cylinder head, said recesses being separate from both of said first and second fluid chambers.

4,683,845

TWO-PISTON INTERNAL COMBUSTION ENGINE (JV-2)

John Velencei, Daly Rd., Far Hills, N.J. 07931

Filed Nov. 26, 1984, Ser. No. 674,944
Int. Cl.[4] F02B *33/24*
U.S. Cl. 123—73 PP **11 Claims**



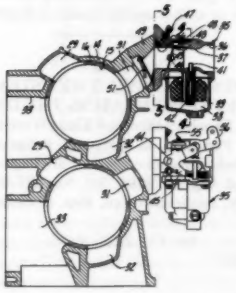
1. An internal combustion engine cylinder assembly comprising a first elongated cylinder having substantially verticlaly disposed interior walls defining an elongated firing chamber therein; first piston means housed within said firing chamber and adapted for vertical reciprocation within said firing chamber; gas inlet channels means in the lower portion of said firing chamber; a crankcase housing having a gas compression chamber disposed therein; valve means adapted to permit fresh fuel/air mixtures to be charged into said gas compression chamber upon the depressuring of said chamber; second cylinder means positioned at the upper end of said first cylinder and having an exhaust chamber therein and a second piston means disposed within said exhaust chamber and adapted for vertical reciprocation therein, said exhaust chamber communicating with the upper end of said firing chamber; said second cylinder means being provided in the lower portion thereof with at least one exhaust gas port adapted for cyclic opening and closing to permit removal of exhaust gases from said firing chamber; at least a portion of said first elongated cylinder extending downwardly into said gas compression chamber and being adapted to house at least a portion of said first piston means during the full downstroke of said first piston means; the upper portion of said crankcase having inwardly sloping walls to define a substantially uniformly converging gas space in the upper portion of said gas compression chamber annularly about said downwardly extending first cylinder portion, said gas inlet channels providing direct gaseous communication between said firing chamber and said converging gas space; said first piston means being arranged to cyclically open and close said gas inlet channels to permit said gaseous communication with said converging gas space; said second piston means being adapted to cyclically open and close said gas exhaust ports to control the removal of exhaust gases from said firing chamber; said first piston means cooperating with said second piston means and said fuel ignition means for controlling the compression and charging of fresh fuel/air mixtures into said firing chamber from said gas compression chamber and the pressurization thereof in said firing chamber for ignition to generate power and to remove from said firing chamber the thus formed exhaust gases.

4,683,846

FUEL SUPPLY DEVICE OF A TWO-STROKE ENGINE FOR AN OUTBOARD MOTOR

Hidekazu Takayasu, Hamamatsu, Japan, assignor to Sanshin, Japan

Filed Jul. 18, 1984, Ser. No. 631,858
Claims priority, application Japan, Jul. 22, 1983, 58-132832
Int. Cl.[4] F02B *33/04*
U.S. Cl. 123—73 A **26 Claims**



1. In a two-cycle crankcase compression internal combustion engine having a crankcase, a pair of aligned, vertically spaced, horizontally disposed cylinder bores terminating at said crankcase, a cylinder head closing said cylinder bores, pistons reciprocating in said cylinder bores, means for admitting at least an air charge to said crankcase, and transfer passage means comprising a plurality of circumferentially spaced transfer passages extending from said crankcase to each of said cylinder bores for transferring a charge from said crankcase to said cylinder bores, the improvement comprising at least one transfer passage for each of said cylinder bores extending substantially horizontally and not disposed between said cylinder bores, and charge forming means for delivering fuel directly to said horizontally disposed transfer passages, the charge flowing from said charge forming means through said one transfer passage in a generally horizontal direction.

4,683,847

VALVE SYSTEM FOR OVERHEAD VALVE TYPE FOUR-CYCLE ENGINE

Tetsuzo Fujikawa, Kobe; Makizo Hirata, and Shinichi Tamba, both of Kakogawa, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hygo, Japan

Filed Dec. 20, 1985, Ser. No. 811,890
Claims priority, application Japan, Dec. 27, 1984, 59-280896
Int. Cl.[4] F01L *1/04*
U.S. Cl. 123—90.2 **1 Claim**

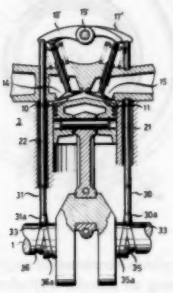
1. A valve system for the overhead valve type four-cycle engine disposing the intake and exhaust valves substantially symmetrically to each other with respect to the cylinder center line, wherein the valve stems are so tilted in the cylinder head that the valve bodies are in juxtaposition close to the cylinder center line, comprising; for each cylinder,

two guide cams disposed around the circumferential surfaces of two crank shafts extending on each side of a crank pin, each cam having a shape of a "figure-eight" folding around the crank shaft while returning back to the starting

point in two turns, and also having one projection in the course of said turn;

two sliding pieces each having an arm extending sideways at the lower end of a stem thereof and engaging at the other end of said arm with one of said guide cams, and said stem of said sliding piece being able to slide parallel to the cylinder center line along a guide hole disposed in the cylinder as well as to rotate about its own axis;

two push rods each engaging at the lower end thereof with the top end of one of said sliding pieces and said two push rods extending essentially parallel to and symmetrical with respect to the cylinder center line; and



two rocker arms being supported at the center thereof by a common rocker shaft disposed in the center of the cylinder head, and each engaging at one end with the top end of one of said push rods and at the other end with the top end of one of said valve stems of said intake or exhaust valve; and

said projection on said guide cam for the intake or exhaust valve being disposed at such a place as to engage with said sliding piece at the rotational angle of the crank shaft corresponding to the opening timing of the intake or exhaust valve.

4,683,848

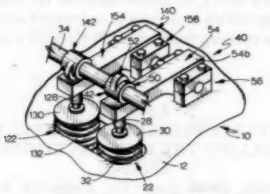
APPARATUS UTILIZING A PLURAL-PROFILED CAM UNIT FOR ACTUATING THE VALVE OF AN INTERNAL COMBUSTION ENGINE

Corliss O. Burandt, Plymouth, Minn., assignor to Investment Rarities, Incorporated, Minneapolis, Minn.

Continuation of Ser. No. 378,842, May 17, 1982, abandoned. This application Mar. 30, 1984, Ser. No. 595,302

Int. Cl.[4] F01L *1/18*

U.S. Cl. 123—90.6 **11 Claims**



1. Apparatus for operating a reciprocable valve assembly associated with a combustion cylinder of an internal combustion engine comprising an axially-fixed camshaft having a central axis, first cam means mounted on said camshaft for rotation therewith, said first cam means having a first base circle portion, and first and second ramp portions, said first ramp portion being connected at one end of said first base circle portion and extending in one direction away from said first base circle portion and gradually increasing in radius in said one direction, said second ramp portion being connected at one end to said first base circle portion and extending in an opposite direction away from said first base circle portion and gradually increasing in radius in said opposite direction, second cam means having a second base circle portion of the same radius as said first base circle portion, a lobe portion radially extending from said central axis a first distance and connecting third and fourth ramp portions, said third ramp portion extending in said one direction away from said second base circle portion and gradually increasing in radius in said one direction, said fourth ramp portion extending in said opposite direction away from said second base circle portion and gradually increasing in radius in said opposite direction, said first cam means having an outermost radial distance less than said first distance and follower means providing a single working surface engageable by both of said first and second cam means, said lobe portion and the third and fourth ramp portions of said second cam means engaging a different portion of the single working surface of said follower means from that engaged by the first and second ramp portions of said first cam means.

4,683,849

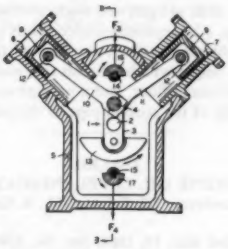
RECIPROCATING MULTICYLINDER VEE MACHINES WITH SECONDARY COUNTERBALANCERS

Arthur E. Brown, R.D. #1, Box 1107, Lake George, N.Y. 12845

Filed Nov. 20, 1984, Ser. No. 673,393

Int. Cl.[4] F02B *75/06*

U.S. Cl. 123—192 B **7 Claims**



1. In a reciprocating machine, the combination of a frame structure, a crankshaft mounted for rotation in said frame structure, two guideways fastened to said frame structure and directed radially outward from said crankshaft, said two guideways being disposed at an angle relative to each other about the axis of the crankshaft, a reciprocable member guided for reciprocation in each said guideway, a connecting rod interconnecting each reciprocable member to said crankshaft for respective reciprocative and rotary motion,

at least one primary counterweight attached to said crankshaft and rotatable therewith, said primary counterweight serving to counterbalance the primary reciprocating inertia forces of said reciprocable members,

at least two secondary balance weights mounted for rotation in said supporting frame on axes offset from the axis of said crankshaft, positive toothed gearing rotatably interconnecting said crankshaft and said secondary balance weights so as to drive the secondary balance weights at twice the RPM of said crankshaft, two of said secondary balance weights driven in opposite directions of rotation from each other, said secondary balance weights serving to counterbalance the secondary reciprocating inertia force of said reciprocable members,

and wherein the improvement comprises; said secondary balance weights being mounted with their axes of rotation substantially parallel to the axis of rotation of said crankshaft, and wherein the angle between the two said guideways is 70 to 110 degrees, and wherein the axis of rotation of one said secondary balance weight is located inside said

70 to 110 degree angle, and wherein the axis of rotation of a second said secondary balance weights is located outside said 70 to 110 degree angle.

4,683,850

OIL SUMPS FOR INTERNAL COMBUSTION ENGINES

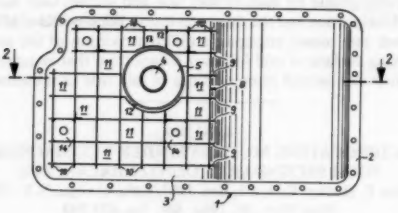
Armin Bauder, Neckarsulm, Fed. Rep. of Germany, assignor to Audi AG, Ingolstadt, Fed. Rep. of Germany

Filed Jul. 22, 1986, Ser. No. 888,761

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1985, 3531352

Int. Cl.[4] F02F 7/00

U.S. Cl. 123—195 C **5 Claims**



1. An oil sump for an internal combustion engine, the oil sump defining a recess, a suction pipe of an oil pump dipping into the recess so as to open at a slight spacing from the floor of the oil sump, a honeycomb-shaped insert positioned in the recess at a slight spacing from the floor of the oil sump, the insert having a height which amounts to a multiple of its spacing from the oil sump floor, and a passageway defined in the insert for receipt of the suction pipe of the oil pump.

4,683,851

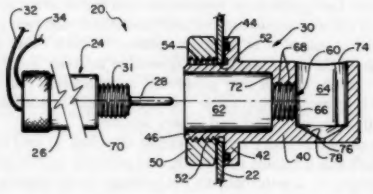
ENGINE OIL LEVEL INDICATOR

James W. Henneberry, 170 Brixton Rd., S. Garden City, N.Y. 11530

Filed Mar. 14, 1986, Ser. No. 839,529

Int. Cl.[4] F01M 1/00

U.S. Cl. 123—196 S **23 Claims**



1. A device for detecting low engine oil levels comprising:

means for detecting the presence of oil in an oil containment vessel for said engine, said detection means including a probe member adapted to detect the presence of oil when in contact therewith;

housing means disposed in said containment vessel for enclosing said detection means; and

chamber means disposed in said housing means and adapted to permit the free flow of oil therethrough for contact with said detection means according to the level of oil in said containment vessel, said chamber means further preventing surging of oil therethrough resulting from movement of the vehicle carrying said engine as well as intermittent splashing of said oil on said detection means resulting from operation of said engine.

4,683,852

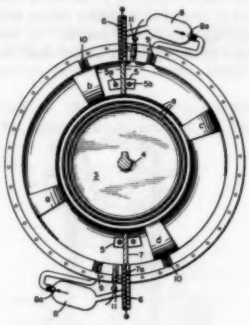
INTERNAL COMBUSTION ENGINE HAVING ROTATING PISTONS

Georg Kypreos-Pantazis, Schwindstrasse 5, 8000 Munchen 40, Fed. Rep. of Germany

Filed Dec. 5, 1984, Ser. No. 678,407

Int. Cl.[4] F02B 53/04

U.S. Cl. 123—230 **6 Claims**



1. In a rotational piston-combustion engine rotating about its center line comprising an annular cylinder (**1***a*,**1***b*), a plurality of pistons (a,b,c,d) fixedly mounted relative to one another and movable as a unit to sweep out circular paths within the annular cylinder, an actuation shaft (**4**) coaxial with the axis of the annular cylinder and rigidly connected to the pistons, a plurality of separating walls (**7**) adapted to move substantially radially inwardly and outwardly to divide the inner space of the annular cylinder into respective chambers, an outlet valve (**10**) upstream of each separating wall with respect to the rotational direction of the piston, an inlet valve (**9**) downstream of each separating wall, an ignition means (**11**), means to retract the separating walls and to allow the passage of a piston and immediately thereafter reinsert them into the cylinder chamber, and a compression chamber (**5**) in the outer wall of the annular cylinder within the range of each separating wall having an automatically opening pressure valve (**5***a*) upstream of the separating wall with respect to the rotational direction of the piston and a control valve (**5***b*) downstream of the separating wall, the improvement comprising two diametrically opposed separating walls (**7**) and four pistons (a–d) arranged in equal circumferential distances to provide, in a complete operating cycle of 540° six induction phases, six compression phases, six expansion phases and six exhaust phases taking place, and the interior of the sealed housings (**6**) fixedly connected with the annular cylinder and receiving the separating walls (**7**) being connected each with a collection chamber (**8**) disposed outside of the cylinder which in its turn is connected with the respective induction opening (inlet valve **9**) through a pressure valve (**8***a*).

4,683,853

VACUUM OPERATED APPARATUS FOR CONTROLLING THE IGNITION TIMING OF AN ENGINE

Samuel Szloboda, 10640 Skagit Dr., Richmond, British Columbia, Canada (V7E 2A2)

Filed Jan. 15, 1987, Ser. No. 3,659

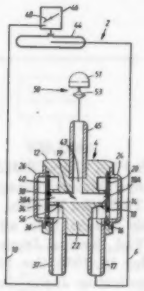
Claims priority, application Canada, Jul. 24, 1986, 514591

Int. Cl.[4] F02P 5/12

U.S. Cl. 123—407 **9 Claims**

1. Vacuum operated apparatus for controlling the ignition timing of an engine, which apparatus comprises valve means and first, second and third conduit means, the valve means comprising a valve body, a first chamber, first and second ports in the first chamber, first obturator means for opening

and closing the second port, a second chamber, third and fourth ports in the second chamber, and second obturator means for opening and closing the fourth port, and passageway means which connects together inside the valve body the second and the third ports, the first conduit means being for connecting the first port to an engine inlet manifold, the third conduit being for connecting the third port to an engine carburettor, and the second conduit means being for connecting the second and the fourth ports via the passageway means to an engine distributor arrangement, and the apparatus being such



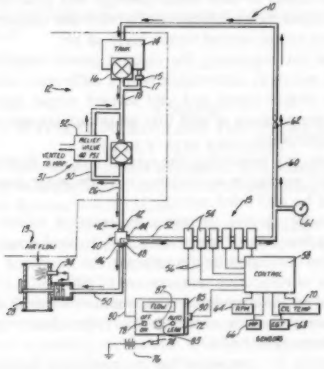
that in use the valve means receives first vacuum forces from the inlet manifold via the first conduit means and second vacuum forces from the carburettor via the third conduit means, the value means being operative to transmit the greater of the first and the second vacuum forces via the second and the fourth ports and the second conduit means to the engine distributor arrangement so that the engine distributor arrangement always receives the optimum vacuum force for causing the optimum adjustment of the engine distributor arrangement to give the optimum engine ingnition timing during engine operating conditions.

4,683,854

ELECTRONIC AND MECHANICAL FUEL SUPPLY SYSTEM

Carl R. Goulet, Daphne, Ala., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Feb. 15, 1985, Ser. No. 702,416
Int. Cl.[4] F02M *51/00*; F02B *77/00*
U.S. Cl. 123—478 **18 Claims**



1. A fuel injection system for internal combustion engines including in combination:

(a) a fuel tank,

(b) a mechanical fuel pump having an inlet and an outlet, with said inlet connected to said fuel tank,

(c) a diverter valve having an inlet, a first outlet, a second outlet, said inlet of said diverter valve being connected to said outlet of said mechanical fuel pump, said diverter valve being movable between a first position in which said diverter inlet is fluidly connected to said first outlet and a second position in which said diverter inlet is fluidly connected to said second outlet,

(d) a first fuel delivery system comprising electrically powered electronic fuel injection means for injecting metered amounts of fuel into each cylinder of said internal combustion engine, inlcuding at least one injector nozzle connected to said first outlet of said diverter valve,

(e) a second fuel delivery system comprising carburation means for mechanically metering the introduction of fuel to the cylinders of said internal combustion engine connected to said second outlet of said diverter valve,

(f) means responsive to an electric signal for moving said diverter valve to said first position, and

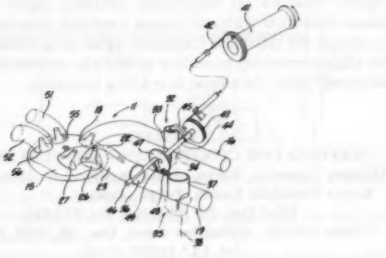
(g) means responsive to the absence of electrical power for automatically moving said diverter valve from first and to said second position.

4,683,855

MULTIPLE VALVE ENGINE

Franz Laimbock, Graz, Austria, assignor to Yamaha, Japan

Filed Aug. 12, 1985, Ser. No. 765,002
Claims priority, application Japan, Aug. 16, 1984, 59-169902
Int. Cl.[4] F02B *29/00*
U.S. Cl. 123—432 **12 Claims**



1. An induction system for an internal combustion engine comprising a variable volume chamber, a first intake passage communicating with said chamber through a first intake port, and a second intake passage communicating with said chamber through second and third intake ports, said first intake passage having a substantially smaller effective cross-sectional area than said second intake passage.

4,683,856

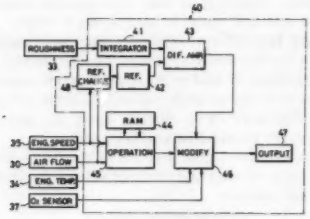
ENGINE ROUGHNESS CONTROL MEANS

Masahiko Matsuura; Nobuo Doi, both of Hiroshima; Sadashichi Yoshioka, Higashihiroshima; Haruo Okimoto, Hiroshima, and Kazuhiko Ueda, Higashihiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Aug. 22, 1985, Ser. No. 768,229
Claims priority, application Japan, Aug. 28, 1984, 59-178697
Int. Cl.[4] F02D *41/04*; F02P *5/15*
U.S. Cl. 123—436 **9 Claims**

1. A control system for a vehicle engine comprising engine condition detecting means for detecting an engine operating condition and producing an engine condition signal representing the engine operating condition, engine combustion control means for controlling a condition of combustion in the engine, control factor storage means for storing control factors for

controlling the engine combustion control means under various engine operating conditions, said storage means being connected with said engine condition detecting means for receiving the engine condition signal therefrom to thereby output one of the control factors for controlling the engine combustion control means which corresponds to the engine operating condition detected by the engine condition detecting means, engine roughness detecting means for detecting engine vibrations caused by unstable engine combustion and producing a roughness signal representing a level of the engine vibrations, reference means for providing a reference roughness signal, comparator means for comparing the roughness signal



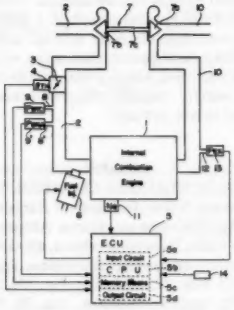
with the reference roughness signal to provide an output signal when the roughness signal exceeds the reference roughness signal, modifying means connected with said comparator means to receive said output signal thereform and to modify the control factor from the storage means by the output of the comparator means so that the combustion control means is controlled by the modified control factor in a direction that the engine vibrations are suppressed, reference signal changing means connected with said engine condition detecting means to change the reference roughness signal in accordance with the engine operating condition so that the reference signal is decreased when the engine is in idling operation.

4,683,857

METHOD FOR CONTROLLING AIR/FUEL RATIO

Akimasa Yasuoka, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 26, 1985, Ser. No. 813,016
Claims priority, application Japan, Dec. 25, 1984, 59-271893
Int. Cl.[4] F02M *51/00*
U.S. Cl. 123—478 **6 Claims**



1. A method for controlling an operation control amount for an internal combustion engine having a supercharger, an intake passage and an exhaust passage, comprising,

detecting an engine speed,

detecting an absolute pressure in the intake passage of the engine,

detecting an exhaust gas pressure in the exhaust passage of the engine,

determining a correction value for said absolute pressure in the intake passage of the engine in accordance with said exhaust gas pressure and said absolute pressure in the intake passage of the engine,

setting a basic control amount in accordance with said correction value for said absolute pressure in the intake passage of the engine,

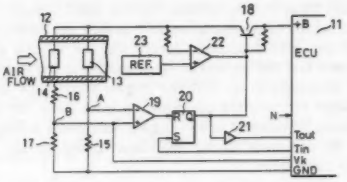
controlling the operational control amount in accordance with said basic control amount.

4,683,858

APPARATUS FOR CONTROLLING ENGINE

Yoshihisa Sato, Nagoya; Masumi Kinugawa, Okazaki; Susumu Akiyama, Kariya; Toshitaka Yamada, Nagoya; Tiaki Mizuno, Toyota, and Atsushi Suzuki, Obu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed May 16, 1986, Ser. No. 863,938
Claims priority, application Japan, Jun. 17, 1985, 60-131270
Int. Cl.[4] F02D *41/34;* **G01M** *15/00*
U.S. Cl. 123—486 **8 Claims**



1. A control apparatus for an engine having an intake passage comprising:

first means positioned in said intake passage for generating heat when supplied with electric power and generating a first output signal indicative of the temperature thereof varying with the supplied electric power and the quantity of air flowing in said intake passage;

second means for sensing the temperature of air flowing to said first means in said intake passage and generating a second output signal indicative of a reference temperature dependent on the sensed temperature of air;

third means for regulating the electric power supplied to said first means in accordance with a difference between said first output signal and said second output signal so that the temperature of said first means attains said reference temperature;

fourth means for measuring the quantity of air flowing in said intake passage in accordance with the electric power regulated by said third means;

fifth means for storing therein compensation values as a nonlinear function of temperature of air, said compensation values corresponding to errors in the measured quantity of air at respective temperature of air;

sixth means for determining a compensation value from the stored compensation values in correspondence to the sensed temperature of air;

seventh means for compensating the measured quantity of air by the determined compensation value; and

eighth means for controlling said engine using the compensated quantity of air.

4,683,859

APPARATUS FOR INJECTING FUEL INTO INTERNAL COMBUSTION ENGINE

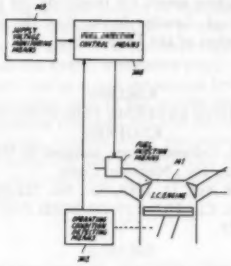
Hiroshi Tamura, Oobu; Kazuyoshi Nishibori, Toyoake; Yasutaka Yamauchi, Toyota, and Katsushi Kato, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Nov. 8, 1985, Ser. No. 796,549

Claims priority, application Japan, Nov. 9, 1984, 59-237367; Nov. 19, 1984, 59-245458; Dec. 3, 1984, 59-255960

Int. Cl.[4] F02D *41/06*

U.S. Cl. 123—491 5 Claims



1. An electronically-controlled fuel injection system for an internal combustion engine, comprising:

(a) means for detecting operating conditions of said engine;

(b) means for injecting fuel into said engine when activated;

(c) controlling means, supplied with a supply voltage, for controlling said injecting means, said controlling means initiating, during normal operation of said engine, activation of said injecting menas in relation to a rotational position of said engine and maintaining said activation of said injecting means during a time period calculated in accordance with the operating conditions of said engine detected by said detecting means; and

(d) means for monitoring the supply voltage and producing first and second outputs indicating respectively that the monitored supply voltage is below and above a predetermined level corresponding to a lowest possible voltage for the operation of said controlling means;

said controlling means initiating, during cranking of said engine, activation of said injecting means each time said output condition of said monitoring means changes from said first to said second output and maintaining activation of said injecting means during a predetermined time period.

4,683,860

DEVICE FOR CONTROLLING THE INCREASED FUEL SUPPLY FOR ENGINES

Haruo Shimamura; Hideo Kobayashi, and Masahiko Asakura, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 3, 1985, Ser. No. 804,304

Claims priority, application Japan, Dec. 3, 1984, 59-254202

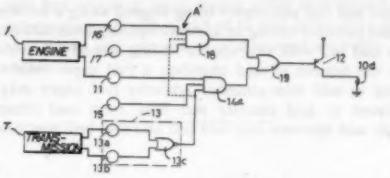
Int. Cl.[4] F02M *7/12*

U.S. Cl. 123—492 12 Claims

1. A device for increasing an amount of fuel to be supplied to an engine associated with a gear transmission, comprising:

a fuel increasing mechanism for supplying an added amount of fuel to the engine; and

an electric control circuit including a low-temperature sensor for detecting a low temperature of the engine to produce a first signal capable of actuating said fuel increasing mechanism, a neutral-gear-condition detector for detecting the neutral-gear condition of the gear transmission to produce a second signal, and means responsive to said



second signal for inactivating said fuel increasing mechanism by overriding said low-temperature sensor.

4,683,861

APPARATUS FOR VENTING A FUEL TANK

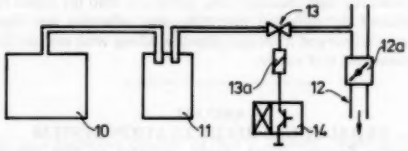
Helmut Breitkreuz, Ingersheim; Albrecht Clement, Kornwestheim; Dieter Mayer; Claus Ruppmann, both of Stuttgart; Dieter Walz, Fellbach; Ernst Wild, Weissach-Flacht, and Martin Zechnall, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 24, 1986, Ser. No. 822,012

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1985, 3502573

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—520 30 Claims



1. Apparatus for venting a fuel tank of an internal combustion engine or the like comprising:

an active-carbon filter container for receiving the fuel vapors in the tank;

an electrically-controlled tank venting valve having a pass-through opening and being arranged between said active-carbon filter container and the engine; and,

control means for continuously changing the cross section of said opening in dependence upon selected operating conditions so as to control the delivery of the tank ventilating mixture to said engine;

said control means including means for supplying said tank venting valve with a clocked drive pulse train changeable with respect to its pulse duty factor in dependence upon operating characteristic quantitities of the engine for changing said cross section; and,

the duty cycle (TVTE) of said drive pulse train for said tank venting valve being at least partially adjusted via an anticipatory control characteristic field via load (t_L) and rotational speed (n) between predetermined values.

4,683,862

FUEL VAPOR STORAGE CANISTER

Joseph Fornuto, Rochester; William E. Gifford, Hemlock, and Karen M. Meyer, Webster, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

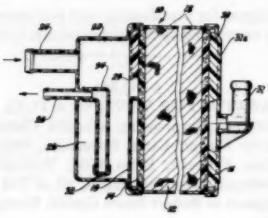
Continuation-in-part of Ser. No. 851,547, Apr. 14, 1986. This application Oct. 15, 1986, Ser. No. 918,887

Int. Cl.[4] F02M *59/00*; B01D *50/00*

U.S. Cl. 123—520 2 Claims

1. A fuel vapor storage canister comprising a housing having

a bed of material adapted to adsorb fuel vapor, and a cover defining an inlet chamber at one end of said bed and separated from said bed by a partition, said canister having a region vented to the atmosphere at the other end of said bed, said inlet chamber and bed and region being aligned along a horizontal axis, said partition having an aperture opening from said chamber to said bed with said aperture being spaced substantially above the bottom of said chamber, a fuel vapor inlet tube opening to said inlet chamber whereby fuel vapor may be introduced to said canister and flow from said chamber through said aperture into said bed and said bed may adsorb



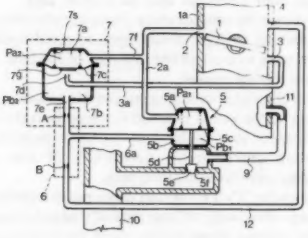
said fuel vapor, and a purge tube opening to said inlet chamber whereby vacuum applied to said purge tube may cause air to flow from said region through said bed and said aperture to said chamber and whereby said air flow may desorb fuel vapor from said bed, and wherein said purge tube has a liquid purge hole disposed near the bottom of said chamber and a vapor purge hole spaced substantially above the bottom of said chamber, whereby said chamber may serve as a trap for liquid fuel introduced through said inlet tube, and whereby said liquid fuel may be purged from said chamber along with said air flow and desorbed fuel vapor.

4,683,863

EXHAUST GAS RECIRCULATION SYSTEM

Katsuhiko Sugiura, Tama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 24, 1985, Ser. No. 813,118
Claims priority, application Japan, Dec. 25, 1984, 59-277674
Int. Cl.[4] F02M *25/06*
U.S. Cl. 123—568 **3 Claims**



1. An exhaust gas recirculation system for an engine having a throttle valve in an intake passage, comprising:

the intake passage having an EGR port provided adjacent to the upstream side of the throttle valve at the closed position thereof, a control port provided at a position at downstream of the throttle valve at the closed position, and a leak port provided at upstream of the throttle valve;

an EGR valve for recirculating exhaust gases to the intake passage,

the EGR valve having a diaphragm defining a first chamber applied with the pressure at the EGR port and a second chamber applied with the pressure at the leak port, a valve body connected to the diaphragm for controlling the amount of recirculated gases;

a control valve having a diaphragm defining a first control chamber and a second control chamber, and valve means provided on the diaphragm,

the first control chamber being applied with the pressure at the EGR port, the second control chamber being applied with the pressure at the control port through a first conduit having an end port and with the pressure at the leak port through a second conduit, the valve means being arranged to open the end port of the first conduit when the difference between pressures in the first and second control chambers exceeds a predetermined value;

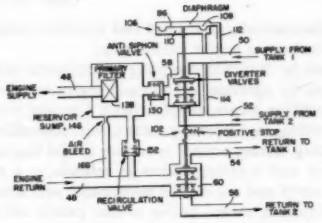
pressure regulating means for rendering the pressure in the second control chamber lower than the pressure in the second chamber of the EGR valve.

4,683,864

FUEL ROUTING SYSTEMS FOR FUEL-INJECTED ENGINES

George H. Bucci, Tolland, Conn., assignor to Whitehead Engineered Products, Inc., Meriden, Conn.

Filed Apr. 11, 1985, Ser. No. 722,253
Int. Cl.[4] F02M *39/00*; B05D *7/01*
U.S. Cl. 123—575 **11 Claims**



1. Fuel routing apparatus for use with a fuel delivery system which supplies fuel to an engine, said system including first and second fuel storage tanks, first and second low pressure pumps for withdrawing fuel from the first and second storage tanks, respectively, and a high pressure pump or supplying fuel to the engine, said apparatus comprising:

(a) first and second feed ports for receiving fuel from the first and second low pressure pumps, respectively;

(b) an engine feed port for delivering fuel to the high pressure pump;

(c) an engine return port for receiving fuel returned from the engine;

(d) first and second return ports for returning fuel to the first and second fuel storage tanks, respectively; and

(e) hydraulically operated valve means having a first position in which the first feed port is connected to the engine feed port and the first return port is connected to the engine return port and a second position in which the second feed port is connected to the engine feed port and the second return port is connected to the engine return port, said means being responsive to the hydraulic pressures produced by the first and second low pressure pumps such that the means is in its first position when the first low pressure pump is supplying fuel to the first feed port and the second low pressure pump is not supplying fuel to the second feed port, and is in its second position when the second low pressure pump is supplying fuel to the second feed port and the first low pressure pump is not supplying fuel to the first feed port, said hydraulically operated valve means comprising:

(i) a first two-position valve connecting the first feed port to the engine feed port when the valve is in its first position, and connecting the second feed port to the engine feed port when the valve is in its second position;

(ii) a second two-position valve connecting the first return port to the engine return port when the valve is in its first position, and connecting the second return port to the engine return port when the valve is in its second position; and

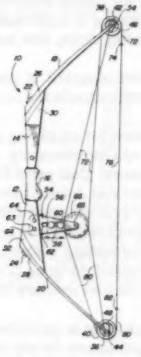
(iii) a chamber separated into first and second portions by a diaphragm which is moveable between first and second positions corresponding to the first and second positions of the hydraulically operated valve means, said diaphragm being connected to said first and second two-position valves, the first and second two-position valves being in their first position when the diaphragm is in its first position and being in their second position when the diaphragm is in its second position, the first portion of the chamber being connected to the first feed port and the second portion of the chamber being connected to the second feed port so that the first portion fills with fuel and moves the diaphragm to its first position when the first low pressure pump is supplying fuel to the first feed port and the second low pressure pump is not supplying fuel to the second feed port, and the second portion fills with fuel and moves the diaphragm to its second position when the second low pressure pump is supplying fuel to the second feed port and the first low pressure pump is not supplying fuel to the first feed port.

4,683,865

COMPOUND ARCHERY BOW

Vincent F. Troncoso, Montrose, Colo., assignor to Golden Key-Futura, Inc., Montrose, Colo.

Filed Apr. 10, 1986, Ser. No. 850,011
Int. Cl.[4] F41B *5/00*
U.S. Cl. 124—24 R **5 Claims**



1. An improved compound archery bow, said bow comprising, in combination:

a. an elongated archery bow riser having a handle and an arrow window on one side thereof;

b. first and second resilient limbs connected at one end thereof to opposite ends of said riser;

c. first and second lever means eccentrically rotatably connected, respectively, to the free ends of said first and second limbs;

d. an arm connected to said riser and extending rearwardly therefrom, said arm comprising at least two telescoping members releasable locked together;

e. a dual track wheel rotatably secured to said arm and being forwardly and rearwardly adjustable behind said riser by said arm to adjust the draw length and draw weight of said bow;

f. a bowstring disposed longitudinally of said bow behind said riser; and,

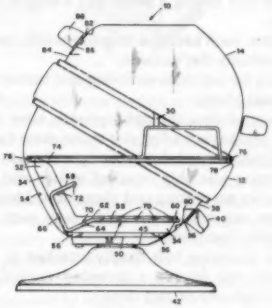
g. first and second cables connected to opposite ends of said bowstring, the opposite end of said first cable being connected to the free end of said first limb and the opposite end of said second cable being connected to the free end of said second limb, said first cable intermediate its ends also being locked in one track of said arm wheel and secured to said first eccentric lever means, while said second cable intermediate its ends is locked to said other track in said arm wheel and secured to said second eccentric lever means.

4,683,866

CHARCOAL COOKER

Emmett R. Bales, Morristown, and George L. Huff, Greeneville, both of Tenn., assignors to Meco Corporation, Greeneville, Tenn.

Filed Aug. 9, 1985, Ser. No. 764,247
Int. Cl.[4] A47J *37/00*
U.S. Cl. 126—25 B **8 Claims**



1. In a barbecue cooker having a cooking vessel with an opening, a bottom, a front side, a rear side, and two lateral sides, a lid for closing the opening of said vessel, said lid having a front and rear for being positioned over the front and rear sides of said vessel opening, respectively, the improvement comprising:

a primary grate disposed within said vessel above the bottom of the vessel and being configured to support a charcoal fire, said primary grate having a front adjacent to the front side of the vessel and a rear disposed distally from the front of the primary grate towards the rear side of the vessel;

at least one support member extending generally upwardly from the rear of said primary grate and being disposed adjacent to the rear side of said vessel; and

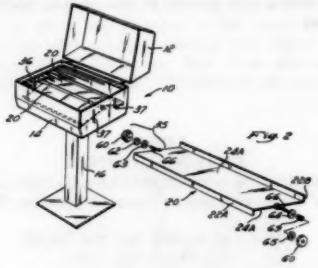
an upper grate supported on said support member at an elevation above said primary grate and substantially adjacent to said rear side of said bowl, said upper grate being configured to support a charcoal fire and proportioned to extend over only a portion of said primary grate so that a continuous unobstructed open space is defined above said primary grate between said primary grate and the food support structure in the area above said primary grate beyond the extension of said upper grate over said primary grate, and said upper grate being spaced from said primary grate at a sufficiently small distance so that a charcoal fire on said primary grate will ignite charcoal disposed on said upper grate, whereby a long lasting charcoal fire may be achieved by starting a fire on said primary grate and placing fresh charcoal on said upper grate for subsequent ignition and burning.

4,683,867

BARBECUE GRILL

Theodore J. Beatty, 53831 Whittaker Forest Rd., Badger, Calif. 93703

Filed Nov. 4, 1985, Ser. No. 794,577
Int. Cl.[4] A47J 37/00
U.S. Cl. 126—41 R 11 Claims



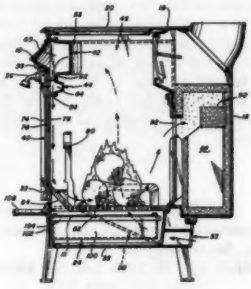
1. A barbecue grill comprising:
a burner unit having a width and a length;
a grate;
two plates, each having a length, a width, and two opposing substantially flat surfaces;
a housing having sides enclosing said burner unit, said grate, and said plates;
two pairs of slots through opposite sides of said housing, each pair having a first slot in one side of said housing and an aligned second slot in the opposite side of said housing;
a tensioning assembly attached to one end of each of said plates for supporting said plates in said housing above said burner unit and below said grate, each said tensioning assembly comprising:
a first mounting bolt fixedly attached to one end of said plate and having a threaded portion extending out through one of said slots;
a spring on said threaded portion outside said housing;
a threaded knob on the end of the threaded portion of said bolt, said tensioning assembly capable of exerting sufficient force on each of said plates when said knob is tightened to prevent said plates from rotating within said housing; and
a rotation assembly attached to the end of each of said plates opposite said mounting bolt for supporting said plates in said housing above said burner unit and below said grate, each said rotation assembly comprising:
a second mounting bolt fixedly attached to said plate having an end extending out through the second slot of a pair of slots;
a knob fixedly attached to said end of said second mounting bolt;
the length of each of said plates being longer than the length of said burner unit but shorter than the length of said housing and the width of each of said plates being shorter than the width of said burner unit, the sum of the widths of said two plates being greater than the width of said burner unit;
each of said plates having an axis of rotation running along the length of each of said plates between said first and said second mounting bolts;
each of said plates being symmetrical about said axis of rotation such that the shape of said plate does not appear to have changed when said plate is rotated 180° about said axis of rotation;
each of said plates having a pair of protruding flanges, said flanges protruding from opposite edges of said plates;
said housing including four convex depressions, four drain channels, and an aperture, all of which are formed in the bottom of said housing;
each of said depressions being located at a corner of the bottom of said housing beneath a respective corner of said plates;
each of said drain channels connecting one of said depressions to said drain hole, said drain channels sloping downward in said housing towards said drain hole.

4,683,868

WOOD BURNING STOVE HAVING GLASS CLEANING SYSTEM

Robert W. Ferguson, South Royalton; Derik K. Andors, Randolph, both of Vt., and E. Smith Reed, Jr., Hanover, N.H., assignors to Vermont Castins, Inc., Randolph, Vt.

Filed Apr. 9, 1986, Ser. No. 849,739
Int. Cl.[4] F23M 7/00; F24C 15/04
U.S. Cl. 126—193 51 Claims



1. A heating apparatus for buring solid fuels comprising:
a frame assembly enclosing a combustion chamber, said frame assembly including front, side and rear walls, a top and a bottom;
a transparent glass panel mounted in one of said walls to permit viewing of combustion in the combustion chamber; and
glass panel cleaning means for supplying a curtain of hot air flowing uniformly and downwardly over the interior surface of said transparent glass panel for maintaining said glass panel at an elevated interior temperature and for forming a barrier to prevent soot and creosote buildup thereon, said glass panel cleaning means including
a first manifold for providing a reservoir of low turbulence air, said first manifold being positioned above said glass panel and having an aperture for directing hot air downwardly,
means for supplying hot air to said first manifold, and
a second manifold positioned below said first manifold, said second manifold receiving air from said aperture of said first manifold and further reducing the turbulence of said air, said second manifold being provided with an exit slot for directing said curtain of hot air downwardly over said glass panel.

4,683,869

BREATH TRANSFER DEVICE

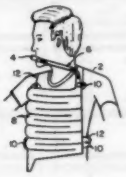
Robert B. Wilcox, 401 W. Lexington Ave., El Cajon, Calif. 92020

Filed May 6, 1986, Ser. No. 860,376
Int. Cl.[4] A61F 7/00
U.S. Cl. 126—204 5 Claims

1. Apparatus for reducing body heat loss and concomitantly preventing the formation of vapor clouds formed by exhaled breath in a cold weather environment comprising:
a heat radiating chamber having a top, a bottom, a front, a back, opposed sides, an air input port and an exhaust port;
said air input port being located near the top of said chamber;

said exhaust port being located near the bottom of said chamber;

said chamber having a plurality of internal partitions being disposed in parallel across the width of said chamber, adjacent ones of said partitions abutting and extending from opposite sides of said chamber part way across the



width of said chamber to provide gaps for completing a sinuous air flow path through said chamber;

means affixed to said chamber for securing said chamber against a portion of the body of a user;

breath confining means having an expelled air port; and

a tube for coupling said expelled air port of said breath confining means to said air input port of said chamber.

4,683,870

APPARATUS FOR DEICING EXTERIOR PARTS OF A RAILWAY VEHICLE

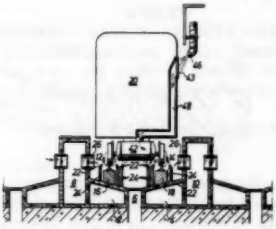
Björn Björklund, Västerhaninge, Sweden, assignor to AB Svenska Flaktfabriken, Nacka, Sweden

Continuation of Ser. No. 349,812, Feb. 18, 1982, abandoned. This application Jul. 22, 1985, Ser. No. 757,491

Claims priority, application Sweden, Mar. 16, 1981, 8101659

Int. Cl.[4] F23C *5/00*; B61B *12/00*

U.S. Cl. 126—271.1 **4 Claims**



1. An apparatus for deicing vehicle exterior parts of a railway vehicle covered with snow and ice, the apparatus comprising at least one fan set including heating means for heating air to a predetermined deicing temperature and pressure increasing fan means, said at least one fan set being connected to at least one supply passage means extending in a longitudinal direction of the railway vehicle being deiced for supplying heated air, a plurality of nozzle means connected in parallel to said at least one supply passage means for blowing said heated air in the form of jets onto the exterior parts of the railway vehicle being deiced at an average striking speed of between 5–35 m/sec, and means for returning a part of the exhausted air to said fan set for reheating and reblowing.

4,683,871

CLOSURE FOR A COOKING OVEN

Francisco J. Salvi, 29 De Lebtiembze, 1743 Lanus, Argentina

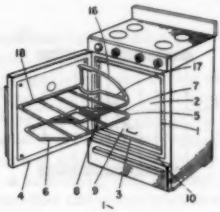
Filed Jul. 19, 1985, Ser. No. 756,704

Claims priority, application Argentina, Jul. 20, 1984, 297,289

Int. Cl.[4] F24C *15/16*

U.S. Cl. 126—340 **2 Claims**

1. An oven comprising an oven chamber having an opening through which articles may be inserted and removed from the oven chamber, a door connected to said oven adjacent said opening and adapted to swing on a substantially vertical axis between a blocked position and an unblocked position relative to said oven chamber opening, a frame surrounding said opening and having flat sides sloping downwardly from an interior top portion of said opening and toward said oven chamber, a hinged plate constructed to substantially conform to said opening, said plate having a hinged connection at said top portion of said opening and thereby adapted to swing on a substantially horizontal axis between a closed position at which said plate rests against said flat sides of said frame to cover said opening and an open position at which said plate is within said oven chamber and substantially parallel with said top portion of said



opening, said door having an inner surface to which is attached an upper horizontal shelf and a lower horizontal shelf adapted to support products for baking in said oven chamber, said lower shelf having a lateral projection extending from an edge thereof adjacent said plate and said upper shelf having a shorter lateral projection extending from an edge thereof adjacent said plate and a curved lateral rail extending upwardly from and being generally perpendicular to said upper shelf at said shorter lateral projection thereof, and said lateral projection, said shorter lateral projection and said curved lateral rail being adapted to sequentially engage said plate to move said plate from said closed position to said open position when said door swings from said unblocked position to said blocked position.

4,683,872

RECEIVER FOR SOLAR ENERGY

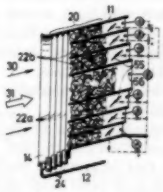
Hans Fricker, Rickenbach-Attikon, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Continuation of Ser. No. 608,240, May 8, 1984, abandoned. This application Jan. 31, 1986, Ser. No. 824,717

Claims priority, application Switzerland, May 9, 1983, 2515/83

Int. Cl.[4] F24J *2/26*

U.S. Cl. 126—449 **17 Claims**



1. A receiver for solar energy comprising

a duct having an entry for receiving radiant solar energy;

a plurality of rows of freely suspended vertical hanging wires disposed in staggered relationship to define a loose structure within and substantially covering said duct entry to absorb radiant energy, each said row having said wires disposed in spaced apart and structurally non-connected relation; and

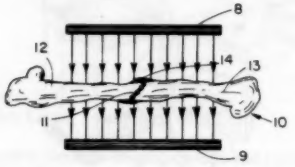
means connected to said duct for conveying a cooling medium through said loose structure to absorb heat therefrom.

4,683,873

METHOD AND DEVICE FOR TREATING LIVING TISSUES AND/OR CELLS BY MEANS OF PULSATING ELECTROMAGNETIC FIELDS

Ruggero Cadossi, and Donata Marazzi, both of Via Geminiola, 1, 42015 Correggio (Reggio Emilia), Italy

Continuation of Ser. No. 616,318, Jun. 1, 1984, abandoned. This application Nov. 12, 1986, Ser. No. 928,935
Claims priority, application Italy, Jun. 2, 1983, 67613 A/83
Int. Cl.[4] A61N *1/40*
U.S. Cl. 128—1.5 **13 Claims**



1. A method for treating living bone tissue by means of pulsating electromagnetic fields to stimulate the growth of said tissue, consisting essentially of electromagnetically inducing in the tissue alternating pulsating electrical signals having a wave form which comprises a positive portion composed, in chronological order, of a first, a second and a third segment, the first of which defines the peak value of said positive portion, and a negative portion composed respectively of a segment which defines the peak value and constitutes the prolongation of the third segment of said positive portion and a region of exponential extension tending to the reference value zero; the positive portion taken together with the zero signal base line having substantially the shape of a trapezium, the peak value of the positive portion being greater in absolute magnitude than the peak value of the negative portion, the duration of said positive portion being between 1 and 3 milliseconds and the frequency of repetition of said pulsating electrical signals being greater than 50 Hz,

with said treatment causing substantial formation of periosteal callus in the region of said bone tissue growth.

4,683,874

BRONCHOFIBERSCOPE

Angelo Acquista, 31-65 Cresent St., Astoria, N.Y. 11106

Filed Feb. 7, 1986, Ser. No. 827,065
Int. Cl.[4] A61B *1/00*
U.S. Cl. 128—6 **5 Claims**

1. An improved bronchofiberscope of the type having a proximal eyepiece end with light source, suction button and channel inlet and an insertion tube with a distal end including an objective lens, light guide and suction/forceps channel, wherein the improvement comprises:

(a) a short inner sleeve that retractably fits over said distal end of said insertion tube;

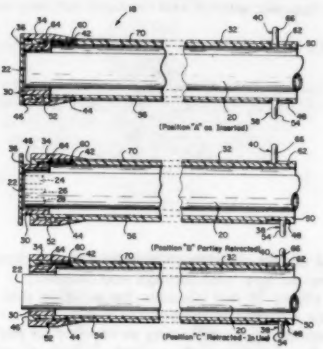
(b) an elongated outer sleeve that fits over said insertion tube to just before said distal end thereof;

(c) a head sleeve that retractably fits over said elongated outer sleeve and said short inner sleeve over said distal end of said insertion tube;

(d) a disolvable membrane that covers said distal end of said insertion tube, said short inner sleeve and said head sleeve to keep said distal end sterile and uncontaminated;

(e) a first means for retracting said head sleeve back over said elongated outer sleeve to release said head sleeve from said disolvable membrane; and

(f) a second means for retracting said short inner sleeve back over said distal end of said insertion tube to release said short inner sleeve from said disolvable membrane to expose said sterile and uncontaminated distal end whereby viewing of windpipe and its branches is done with said



light guide and said objective lens and sterile removal of bronchial secretions is facilitated through said suction/forceps channel to remove an uncontaminated specimen for an appropriate bacteriologic examination.

4,683,875

GUM MASSAGER

Lewis Rabinowitz, 4702 W. Northview, Glendale, Ariz. 85301

Division of Ser. No. 700,182, Feb. 11, 1985, abandoned, which is a division of Ser. No. 391,530, Jun. 24, 1982, Pat. No. 4,535,761. This application May 23, 1986, Ser. No. 870,300
Int. Cl.[4] A61H *7/00*
U.S. Cl. 128—62 A **4 Claims**

1. Apparatus for massaging gums comprising:

(a) an elongated handle for manipulation of the apparatus;

(b) a tapered substantially rigid gum massaging element having a substantially pointed end for insertion between the teeth of a user and having an enlaged other end; and

(c) a coupling interconnecting one end of said handle and the enlarged end of said tapered gum massaging element, said coupling being a piece of flexible resilient material having a coil spring embedded therein and having opposite ends one of which is connected to the one end of said handle with the other end being connected to the enlarged end of said tapered gum massaging element so that when the pointed end of said tapered gum massaging element is inserted between the teeth of a user and said handle is articulated, a swivel-like gum massaging motion of said element will result.

4,683,876

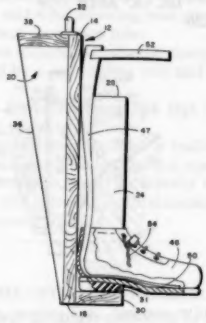
ORTHOPEDIC GUIDE

Valley Changras, 5031 Shirley Dr., La Palma, Calif. 90623

Filed Mar. 10, 1986, Ser. No. 837,804
Int. Cl.[4] A61F *5/00*
U.S. Cl. 128—80 R **9 Claims**

7. An orthopedic guide comprising an elongated backing slab having parallel sides and opposite upper and lower edges, a pair of side walls secured to said parallel sides of said backing

slab perpendicular thereto and having upper and lower edges and defining an elongated channel in conjunction with said backing slab, a transverse bottom end wall located at the lower edges of said backing slab and said side walls and oriented perpendicular to said backing slab and to said side walls to



close said lower end of said channel, wherein said side walls have rear edges on the side of said backing slab opposite said bottom end wall, and said rear edges are parallel to each other and inclined relative to said backing slab and converge toward said backing slab at said transverse bottom end wall, and a handle located at said upper edge of said backing slab.

4,683,877

ORTHOPEDIC CASTING ARTICLE AND METHOD

Dean A. Ersfeld, Maplewood, Minn.; Timothy C. Sandvig, Woodville, Wis., and Diane S. Gobran, Roseville, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 4, 1985, Ser. No. 784,345
Int. Cl.[4] A61F *5/04*
U.S. Cl. 128—90 **35 Claims**

1. An article suitable for forming an orthopedic cast around an animal body part comprising:

a unitary blank having first and second lateral free edges, said blank being dimensioned in one direction sufficient to extend the length of said body part and dimensioned in a second direction sufficient to at least circumferentially envelop said body part, said blank comprising:

(a) a pliant, extensible layer of an at least partially open-celled foam member,

(b) an extensible fabric bonded to at least one major surface of said foam member, and

(c) a curable resin impregnatably associated with said foam member of said blank whereby, upon activating said curable resin and stretchingly bringing laterally disposed portions of said blank together into sealing relationship around said body part, said orthopedic cast is provided.

34. A method for forming an orthopedic cast around an animal body part comprising the steps of:

(a) providing a unitary blank according to claim **1**;

(b) activating said resin associated with said blank;

(c) stretching said blank around said body part to conform said blank to said body part and form said orthopedic cast, and

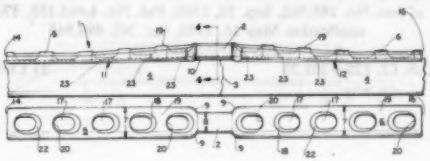
(d) overlapping said blank to provide a double thickness of said blank over a predetermined portion of said body part.

4,683,878

OSTEOSYNTHETIC FIXATION PLATE

Dennis R. Carter, Palo Alto, Calif., assignor to Kirschner Medical Corporation, Timmonium, Md.

Filed Apr. 29, 1985, Ser. No. 728,185
Int. Cl.[4] A61F *5/04*
U.S. Cl. 128—92 YP **20 Claims**



1. An osteosynthetic bone fixation plate for securing fractured or disjointed bones, comprising:

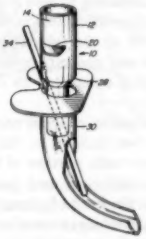
a unitary, elongated, rigid plate having a central portion of sufficient length to bridge a fracture site, said central portion having a substantially square cross-sectional shape throughout its length, and two oppositely directed end portions, each of which extends axially from said central portion to a terminating end, said end portions having a width greater than said central portion and having a thickness which decreasingly tapers from said central portion to said terminating ends, said end portions also having a plurality of elongated holes, each of said holes having a vertical distal end wall and an inclined proximal end wall, whereby said plate, when secured to said fractured bones with a plurality of bone screws, places said fractured bones in compression with respect to one another at said fracture site.

4,683,879

DUAL FUNCTION CONNECTOR FOR USE WITH ENDOTRACHEAL APPARATUS

R. Tudor Williams, 3423 Utah Crescent NW., Calgary, Alberta, Canada T2N 4A9

Filed Oct. 20, 1986, Ser. No. 920,618
Int. Cl.[4] A61M *16/00*
U.S. Cl. 128—200.26 **3 Claims**



1. A dual function connector for releasable attachment to an endopharyngeal tube, airway intubator or the like, said connector comprising:

a cylindrical tube having a large diameter proximal portion sized to fit within an airway intubator and a distal portion with a smaller diameter than said proximal portion;

flange means on said proximal portion extending substantially normal to the longitudinal axis of said connector; and

an elongated slot in said connector extending from said distal end throughout the length of said distal portion and into said proximal portion.

4,683,880

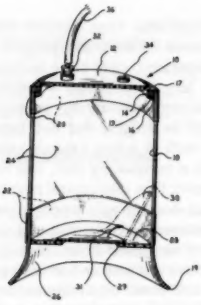
TOXIC FUME PROTECTIVE HOOD AND METHOD OF CONSTRUCTION

Bertil Werjefelt, Kailua, Hi., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 228,940, Jan. 27, 1981, Pat. No. 4,440,164, which is a continuation-in-part of Ser. No. 73,612, Sep. 10, 1979, Pat. No. 4,443,318, which is a continuation-in-part of Ser. No. 185,962, Sep. 10, 1980, Pat. No. 4,461,155. This application May 16, 1983, Ser. No. 494,845

Int. Cl.[4] A62B 7/00

U.S. Cl. 128—201.28 11 Claims



1. A smoke hood for protecting the user of said hood from fire and inhalation of a noxious surrounding environment, said smoke hood comprising

(a) a generally tubular portion having open upper and lower ends and a continuous sidewall having inner and outer side surfaces, said generally tubular portion being comprised of a fire-resistant and gas-impermeable transparent film;

(b) a first reflective strip located on the outer side of said continuous sidewall adjacent to said upper end;

(c) a second reflective strip located on the outer side of said continuous wall adjacent to said lower end;

(d) a generally circular hood portion, the peripheral edges of which are secured to the tubular portion, comprised of said fire-resistant and gas-impermeable film, said circular hood portion being connected to the upper end of said tubular portion;

(e) a substantially annular, resilient neck seal, the peripheral edges of which are secured to the tubular portion, attached to the inner side portion of the lower end of said tubular portion, said neck seal having an opening for admitting at least the head of a user into said smoke hood to form an air-tight closure around said user, said neck seal being attached to the inner side portion of the lower end of said tubular portion sufficiently above the lower edge to form a protective skirt for the body of the user;

(f) an inflow valve attached to said smoke hood and adapted to be connected to a hose that communicates with an air supply system in order to conduct fresh air to the interior of said hood; and

(g) an outflow valve attached to said smoke hood and adapted to permit air to escape from the hood with increased internal pressure inside the hood, and wherein said tubular portion and said circular hood portion are distinct elements adhesively attached to each other by double-sided tape of fire-resistant and gas-impermeable transparent material.

4,683,881

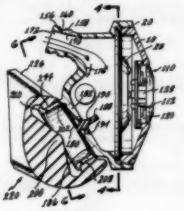
BREATHING REGULATOR MOUTHPIECE

Harmon R. Hansen, Stanton, and Thomas A. Lingenfelter, Garden Grove, both of Calif., assignors to U.S.D. Corp., Santa Ana, Calif.

Filed Oct. 30, 1985, Ser. No. 792,809

Int. Cl.[4] A62B 7/04

U.S. Cl. 128—204.26 20 Claims



14. The method of providing regulated breathing gas comprising:

providing a chamber;

connecting said chamber to a supply of breathing gas;

introducing said gas into said chamber by means of a valve;

causing said valve to function by moving said valve through the means of a lever;

moving said lever by means of a diaphragm which when moved into said chamber causes said lever to deflect and move said valve;

providing a mouthpiece in connected relationship to said chamber;

flowing exhaust from a breather to said mouthpiece into said chamber over a curved surface to enhance laminar flow as exhaust from said mouthpiece is introduced into said chamber; and,

exhausting flow from said mouthpiece through an exhaust valve which is nearer to said curved surface than any other portion of where exhaust is introduced into said chamber.

4,683,882

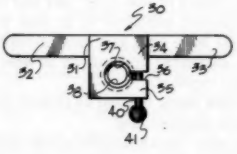
ENDROTRACHEAL TUBE HOLDER

Jesse S. Laird, 15461 Camarillo St., Sherman Oaks, Calif. 91403

Filed Nov. 8, 1985, Ser. No. 796,260

Int. Cl.[4] A61M 25/02

U.S. Cl. 128—207.17 1 Claim



1. An endotracheal tube holder adapted to be applied to the facial area of a patient to retain and support such a tube comprising the combination of:

a base means having a central opening therein accommodating passage of said tube;

attachment means mounted on said base means for removable securement to the facial area of the patient;

adjustable clamp means operably carried on said base means for releasably coupling to said tube to positively retain said tube in position with respect to the patient's facial area;

said attachment means includes elongated straps or strips

outwardly extending from opposite sides of said base means and extending no more than the facial area of the patient;

an adhesive layer of low contact adhesive carried on the backside of said straps or strips;

said clamp means includes manual adjustment means carried on said base means for tightening and loosening said clamp means about said tube allowing said clamp means to advance or retract about said tube;

said clamp means includes a C-shaped clamp having a pair of legs separated by a gap leading into said central opening; and

a screw means interconnecting said legs to close said C-shaped clamp about said tube;

said clamp means further includes a resilient grommet of constant inner diameter in said central opening to partially reduce its diameter so as to frictionally engage with and support said tube in response to actuation of said adjustabie clamp means.

4,683,883

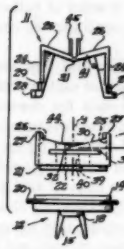
TWO-PIECE HEART VALVE HOLDER/ROTATOR

Richard L. Martin, Austin, Tex., assignor to Hemex Scientific, Inc., Austin, Tex.

Filed Apr. 30, 1985, Ser. No. 728,836

Int. Cl.[4] A61F *2/24*; A61B *17/00*

U.S. Cl. 128—303 R **10 Claims**



1. A heart valve holder for holding a heart valve prosthesis during implantation, comprising, in combination:

a plug means having opposite ends, one of which has a valve-engaging means and having passageway walls defining at least two passageways each extending in a generally axial direction between said opposite ends; and

grip means including two legs extending through said passageways in the plug means, said legs each having a valve-engaging means at the free end thereof and a radially outward-facing surface adjacent a radially inward-facing surface of one of said passageway walls, said valve engaging means of said legs being movable between valve-engaging and valve-releasing positions in response to substantially axially directed movement of said grip means relative to said plug which effects camming engagement between said radially inward-facing surfaces and said radially outward-facing surfaces that cams said free ends radially inward.

4,683,884

NOISE ATTENUATING SMOKELESS SURGICAL DEVICE

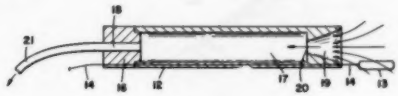
Gregory A. Hatfield, and Robert E. Lash, both of Foster City, Calif., assignors to MD Engineering, Foster City, Calif.

Filed Apr. 11, 1986, Ser. No. 850,664

Int. Cl.[4] A61B *17/36*

U.S. Cl. 128—303.14 **4 Claims**

1. In a device for removing smoke and vapor from a generation site by a vacuum induction device, apparatus for reducing acoustic energy generated by the vacuum induction device, including a housing, a bore extending through said housing, means for connecting one end of said bore to a source of negative gauge pressure; intake means at the other end of said bore for receiving ambient atmosphere by vacuum induction, including an intake port disposed at said other end of said bore, said intake port including an outermost opening, a tapered wall extending smoothly inwardly from said intake port to said bore and defining a narrow throat at the inner end thereof, said bore



comprising a cylindrical passage having a diameter substantially greater than said throat, said connecting means comprising an end wall at said other end of said bore having a central opening therethrough, said end wall extending generally transverse to the axis of said cylindrical passage, whereby said throat is connected directly to said opening formed centrally in said end wall.

4,683,885

METHOD FOR TYING SEWING THREADS

Frieder Hutterer, Cologne; Gerd Buess, Pulheim/Stommeln, and Manfred Boebel, Oetisheim, all of Fed. Rep. of Germany, assignors to Richard Wolf GmbH, Fed. Rep. of Germany

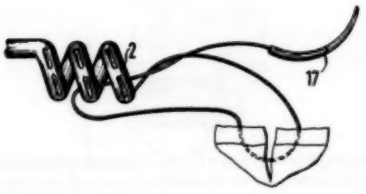
Division of Ser. No. 721,669, Apr. 10, 1985, Pat. No. 4,641,652.

This application Sep. 22, 1986, Ser. No. 909,730

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1984, 3413744

Int. Cl.[4] A61B *17/04*; B65H *69/04*

U.S. Cl. 128—334 R **2 Claims**



2. A method of stitching a wound in a body cavity using an applicator comprising the steps of:

a. providing an applicator having a shaft with proximal and distal ends and a longitudinal duct extending therethrough for receiving a thread, and a hollow open-ended helical tube extending from the distal end of the shaft with an inside being in communication with a distal portion of the duct;

b. passing a thread through the helical tube and the longitudinal duct of said applicator;

c. attaching a needle to the free end of said thread extending from said helical tube;

d. positioning said needle, and the distal end of the applicator with the helical tube adjacent to said wound;

e. passing said needle through tissue on both sides of said wound;

f. passing said needle axially through at least one turn of said

helical tube to form a thread loop, and then passing the needle through said thread loop;

g. rotating said applicator shaft to disengage said helical tube from said thread loop and to form a first half of a knot;

h. moving said needle and said helical tube away from one another to tighten said first half knot and

i. forming a second half knot to complete the knot by repeating steps (f) to (h).

4,683,886

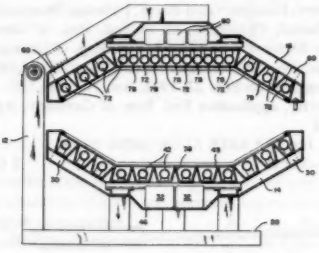
COUNTERBALANCE SYSTEM FOR THE TOP OF A TANNING BED

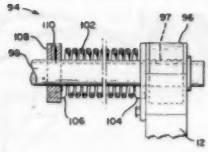
Sharon D. Kramer, Rte. 6, Box 233; John Kramer, 806 Lynn Pl.; Donald Kramer, 9913 W. Meadowbrook, and Clark Kramer, Rte. 6, Box 255K, all of Yakima, Wash. 98907

Division of Ser. No. 642,565, Oct. 14, 1985, Pat. No. 4,600,009. This application May 19, 1986, Ser. No. 865,176

Int. Cl.[4] A61N *5/06*

U.S. Cl. 128—376 **2 Claims**





1. A counterbalance system for use in conjunction with a tanning system having a heavy pivotable upper unit and a stationary lower unit secured to a frame, the system adapted to counterbalance the weight of the upper unit, comprising:

a pair of pivot arms mounted in parallel fashion to substantially opposite ends of said upper unit;

an axle, said axle coupled to and extending in a substantially perpendicular manner between each of said arms;

a set of preloaded torsion spring means each having a plurality of coils wound around opposite ends of said axle, one end of each of said coils being proximal to said arms and fixedly attached to said frame, the other end of each of said coils being distal to said arms and releasibly coupled to said axle in operative association therewith such that substantially all of the weight of said upper unit is offset by said spring means, and wherein the counterbalance force provided by the spring means may be adjusted by adjusting the preload on either of the spring means.

4,683,887

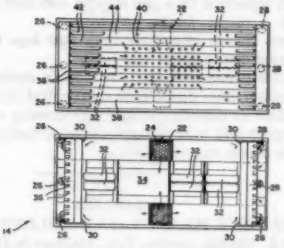
AIR CIRCULATION SYSTEM FOR A TANNING SYSTEM

Sharon D. Kramer, Rte. 6, Box 233; John Kramer, 806 Lynn Pl.; Donald Kramer, 9913 W. Meadowbrook, and Clark Kramer, Rte. 6, Box 255K, all of Yakima, Wash. 98907

Division of Ser. No. 642,565, Oct. 14, 1985, Pat. No. 4,600,009. This application May 19, 1986, Ser. No. 865,178

Int. Cl.[4] A61N *5/06; F21V 29/00*

U.S. Cl. 128—376 **8 Claims**



1. An improved air circulatory system for use in a tanning system having a stationary lower unit and a movable upper unit secured to a frame, both of the units provided with a series of ultraviolet light generating lamps positioned thereon operatively connected to a series of ballasts, comprising:

cooling air intake vents located centrally along the length of each unit; and

a series of exit fans, said fans including at least two fans positioned at each of said opposite ends of said upper unit and said lower unit for drawing air from said central intake vents and along the interior of said upper and lower units; each said unit having an elongated channel panel, said fans at each end being spaced from one another and positioned at the ends of said channel panels; said panel having vertically extending channel side walls and a bottom wall for housing said lamps, a plurality of apertures formed in the bottom wall and positioned to concentrate air flow to the lamps in the area of the unit that generates the maximum heat for aiding the lamps to be energized at a generally constant temperature.

4,683,888

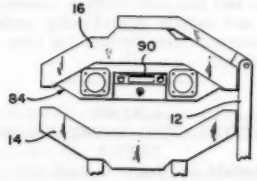
AUDIO SOUND SYSTEM FOR A TANNING SYSTEM

Sharon D. Kramer, Rte. 6, Box 233; John Kramer, 806 Lynn Pl.; Donald Kramer, 9913 W. Meadowbrook, and Clark Kramer, Rte. 6, Box 255K, all of Yakima, Wash. 98907

Division of Ser. No. 642,565, Aug. 20, 1984, Pat. No. 4,600,009. This application May 19, 1986, Ser. No. 865,177

Int. Cl.[4] A61N *5/06*

U.S. Cl. 128—376 **5 Claims**



1. An audio console mounted within an ultraviolet light generating tanning system, comprising:

a substantially rigid and acoustical housing mounted to said tanning system in the location adjacent the head of the system occupant, said housing having at least one integral speaker sound chamber formed therein and isolated from

the remainder of the housing, said chamber being sentagonal in vertical cross section and containing an audio speaker; and

a set of controls including a tuner, said controls positioned in an inverted fashion and readily accessible to an individual positioned on said system, said controls connected to said speakers in operative association therewith.

4,683,889

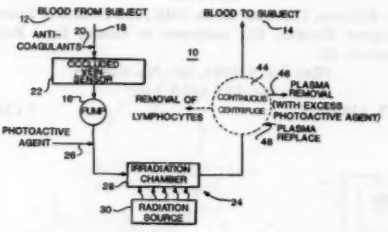
METHOD AND SYSTEM FOR EXTERNALLY TREATING THE BLOOD

Richard L. Edelson, 3 Rall Ct., Roseland, N.J. 07068, assignor to Frederic A. Bourke, Jr.; Eleanor F. Bourke; Richard L. Edelson and The Edelson Trust, East Norwalk, Conn.

Division of Ser. No. 480,096, Mar. 29, 1983, which is a continuation-in-part of Ser. No. 447,891, Dec. 8, 1982, and Ser. No. 327,965, Dec. 7, 1981, abandoned, which is a continuation-in-part of Ser. No. 102,553, Dec. 11, 1979, Pat. No. 4,321,919, said Ser. No. 447,891, is a continuation-in-part of Ser. No. 274,319, Jun. 16, 1981, Pat. No. 4,428,744, and Ser. No. 272,981, Jun. 12, 1981, Pat. No. 4,398,906, each is a continuation-in-part of Ser. No. 102,553,. This application Jun. 21. 1985, Ser. No. 747,408

Int. Cl.[4] A61M *5/00*; B01D *21/26*

U.S. Cl. 128—395 **25 Claims**



1. A system for treating blood from a subject in order to reduce the functioning population of a blood constituent by associating and reacting said constituent with a photoactive agent which comprises:

(a) means for receiving said blood and subjecting said blood to a density gradient whereby red blood cells are substantially separated from said blood consitituent;

(b) a photoactive agent to be associated with said blood constituent;

(c) a source of UV radiation oriented so as to preferentially impinge upon said blood constituent so as to react the associated photoactive agent with said blood constituent.

4,683,890

METHOD AND APPARATUS FOR CONTROLLED BREATHING EMPLOYING INTERNAL AND EXTERNAL ELECTRODES

Carl E. Hewson, Marshfield, Mass., assignor to Brunswick Manufacturing Co., Inc., North Quincy, Mass.

Continuation of Ser. No. 812,015, Dec. 23, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,244

Int. Cl.[4] A61N *1/36*

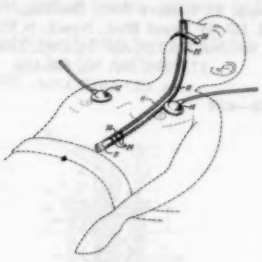
U.S. Cl. 128—419 PG **13 Claims**

1. Medical apparatus for inducing breathing in humans comprising

an internal elongated first electrode member for insertion into the esophagus and having a distal end carrying a plurality of spaced apart ring contacts to be positioned in the lower portion of the esophagus,

ECG-type external second and third electrode members for placement on the chest in the region of the nipples and above the rib cage,

and electrical circuit means connected to the three electrode members for passing a current between the internal and external electrode members at a rate of between 10 and 18 pulses per minute with each pulse having a duration of



approximately two seconds and of a maximum value of approximately 100 milliamperes.

4,683,891

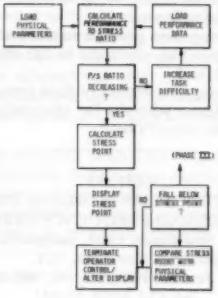
BIOMONITORING STRESS MANAGEMENT METHOD AND DEVICE

Vincent Cornellier, 1970 Connolly, Troy, Mich. 48084, and Thomas K. Ziegler, 2058 Franklin, Berkley, Mich. 48072

Continuation-in-part of Ser. No. 371,917, Apr. 26, 1982, abandoned. This application Feb. 11, 1985, Ser. No. 700,376

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—630 **26 Claims**



1. A method of increasing a person's ability to perform under anxiety induced, psychophysiological stress, comprising the steps of:

(A) providing a computer controlled device including an interactive communication link between said device and said person;

(B) programming said computer for controlling said device to create a task of progressively increasing difficulty to be accomplished by said person whih creates anxiety in said person;

(C) determining the level of psychophysiological stress of said person induced by said anxiety beyond which the performance of said person in accomplishing said tasks decreases;

(D) providing said person with an indication of the level of psychophysiological stress determined in step (C);

(E) allowing said person's stress level to fall below the level indicated in step (D), then changing said task in a manner to increase the stress level experienced by said person in accomplishing said task.

4,683,892

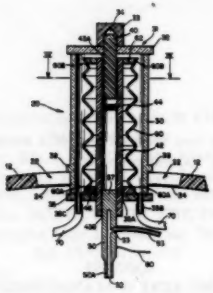
METHOD AND APPARATUS FOR CONDUCTING BRAIN FUNCTION DIAGNOSTIC TEST

Nils E. Johansson, 18 Pine Rd., Bedford Hills, N.Y. 10507; Emin Eralp, 11 Eastern Ave., Ossining, N.Y. 10562, and Turan M. Itil, 49 Tweed Blvd., Nyack, N.Y. 10960

Division of Ser. No. 726,729, Apr. 24, 1985. This application Jul. 17, 1986, Ser. No. 886,416

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—639 5 Claims



1. An electrode retaining assembly comprising:

a fluid pressure operated reciprocating bellows device having a central opening adapted to receive and hold an electrode therein;

means for retaining the bellows device on a subject's head;

an elongated electrode having a tapered tip for electrically contacting the head of a subject undergoing an EEG test, said elongated electrode being mounted in the central opening of said bellows device;

means for applying fluid pressure to the bellows device to thereby displace the electrode in the direction of the subject's head; and

means for reducing the amount of fluid pressure applied to the bellows device whereby the electrodes are retracted away from the subject's head.

4,683,893

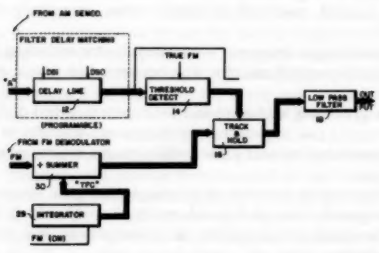
AMPLITUDE CONDITIONAL SIGNAL PROCESSING FOR ULTRASOUND FREQUENCY ESTIMATION

William T. Mayo, Seal Beach, Calif., assignor to North American Philips Corporation, New York, N.Y.

Filed Jun. 30, 1986, Ser. No. 880,402

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—660 5 Claims



1. In an improved system for conditional estimation of frequency of ultrasonic waves in a medium using the RF signal of pulse echo data, wherein said system receives pulse echo data in the form of an rf signal, demodulates the AM component of said rf signal in an AM demodulator; and demodulates the FM component of said RF signal in an FM demodulator; and processes both the demodulated AM signal and the demodulated FM signal simultaneously, delaying the AM signal to match the delay in output from said FM demodulator, a conditional signal processing means comprising:

means to add a time-frequency compensation factor to the demodulated FM signal which estimates the attenuation induced frequency downshift over time;

means to set a threshold for the amplitude of said demodulated AM signal;

means to determine when said demodulated AM signal falls below said threshold;

means to interrupt the processing of said FM signal when said AM signal falls below said threshold, discarding all FM signals until said AM signal rises above said threshold;

means to retain the last value of said FM signal during said interruption;

means to resume the processing of said FM signal after said AM signal exceeds said threshold; and

means to interpolate the frequency of said FM signal during said interruption;

thereby providing an improved estimate of the frequency of said FM signal.

4,683,894

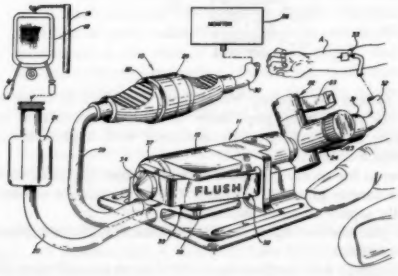
DISPOSABLE PHYSIOLOGICAL PRESSURE SENSING SYSTEM

Roy K. Kodama, Thousand Oaks, Calif., and Donald J. Koneval, Arlington Heights, Ill., assignors to Gould, Inc., Rolling Meadows, Ill.

Filed Jul. 9, 1984, Ser. No. 629,298

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—675 9 Claims



1. In a throwaway physiological pressure system having a housing, improved sensor means comprising:

displaceable means connected to said housing and responsive to fluid pressure to provide a reciprocative output corresponding to said fluid pressure;

a strain isolator connected to said housing by a support and having a beam support surface, said support engaging a surface of said isolator other than said beam support surface and positioning said isolator so that said beam support surface is spaced from said housing, whereby said beam support surface is substantially free from thermally induced distortion caused by heat flow from said isolator to said housing and from said housing to said isolator;

a deflectible beam defining opposite first and second surfaces, a distal end and a mounting end;

means affixed to said beam and responsive to deflections of said beam for providing corresponding strain signals; and

means for mounting said mounting end of the beam to said strain isolator with said second surface fixed to said beam support surface and with said distal end cantilevered from said strain isolator, said first surface being engaged by said displaceable means adjacent said distal end, whereby upon deflection of said beam by said displaceable means said

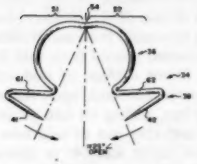
first surface is placed in tension and said second surface is placed in compression.

4,683,895

SUTURE SLEEVE ANCHORING DEVICE

Peter J. Pohndorf, Miami, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Jul. 25, 1985, Ser. No. 758,741
Int. Cl.[4] A61B *17/04*; F16B *15/00*
U.S. Cl. 128—784 **8 Claims**



1. Anchoring assembly for affixing a lead body to tissue, said anchoring assembly comprising:

a biocompatible suture sleeve having a tube wall defining an axial orifice, the tube wall including at least one external circumferential groove and surrounding the lead body which extends axially through the orifice; and

a biocompatible anchoring device compressively manipulatable with hand tools from an open position to an affixed position, said anchoring device including: a first generally hemicircular portion adapted to be received within the side of a circumferential groove of said biocompatible suture sleeve; a second generally hemicircular portion adapted to be received within the other side of said circumferential groove of said biocompatible suture sleeve; a moderately stiff hinge means portion extending between said first and second generally hemispherical portions which is deformed by manipulation to cause said device to move from the open position to the affixed position; a first staple portion depending from said first generally hemicircular portion at and end of said first generally hemicircular portion farthest from said hinge portion and including a prong outwardly offset from the arc of said hemicircular portion in a manner which is adapted to puncture and then grip tissue as said device is manipulated from the open to the affixed position; and a second staple portion depending from said generally hemicircular portion at an end of said second generally hemicircular portion farthest from said hinge portion and including a prong outwardly offset from the arc of said hemicircular portion in a manner which is adapted to puncture and then grip tissue as said device is manipulated from the open to the affixed position.

4,683,896

METHOD FOR FIXING AN ELECTRICAL ELECTRODE TO BONE TISSUE

Ewa Herbst, Jungfrudansen 24, 171 56 Solna, and Lars I. Botvidsson, Järfälla, both of Sweden, assignors to Ewa Herbst, Solna, Sweden

Filed Nov. 13, 1984, Ser. No. 671,081
Int. Cl.[4] A61N *1/04*
U.S. Cl. 128—785 **18 Claims**

1. A method for attaching through soft tissue an electrode to bone tissue, said electrode having a rigid electrode tip and a flexible electric cable connected to the electrode tip and being electrically insulated against surrounding soft tissue, comprising the steps of:

applying one end of an elongated guide means having a longitudinally extending channel to an outer surface of soft tissue adjacent a selected location of bone tissue;

moving the one end of the elongated guide means through the soft tissue towards the bone tissue;

preforming a hole in the bone tissue by introducing a member through said channel;

introducing through the channel an electrode having a rigid electrode tip, a flexible cable connected thereto and means for stiffening the cable, said cable stiffening means releasably connected with said electrode tip;

displacing the cable stiffening means through the guide means so as to move the electrode tip into contact with the bone tissue adjacent said hole;

threading the electrode tip into the bone tissue adjacent said hole so that said electrode tip is located in the bone tissue ; and

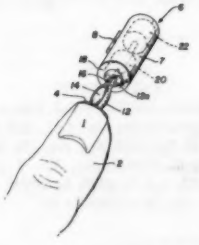
removing the stiffening means and the guide means so as to leave a part of the flexible cable exposed above the outer surface of the soft tissue, whereby the cable may be connected to an electric current or voltage source and said electrode tip may remain in the bone tissue after treatment.

4,683,897

ELECTRIC NAIL FILING DEVICE

Julia K. McBride, 8910 Second St., Lanham, Md. 20706

Filed May 8, 1985, Ser. No. 731,757
Int. Cl.[4] A45P *29/05*
U.S. Cl. 132—73.6 **10 Claims**



1. A fingernail or toenail filing device, comprising;

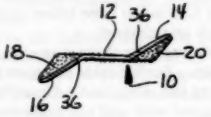
a housing;
a drive shaft extending from said housing;
a drive means disposed within said housing, for rotationally driving said drive shaft;
a filing member, rotatable about a longitudinal axis, having a surface capable of providing fine nail filing when in use and having a shape which is symmetrical about the longitudinal axis thereof, the shape tapering toward one longitudinal end thereof, said filing member being connected to said drive shaft at the end of said filing member opposite said tapering end; and
protective skin guard means, connected to said housing, comprising a thin shell of shaped substantially corresponding to that of said filing member, extending substantially from the end of the longitudinal axis connected to said drive shaft to the tapered end and surrounding about 180° to about 260° around said filing member, as measured in a plane perpendicular to the longitudinal axis, and including a portion substantially covering the tapered end tip of said filing member, said skin guard means being closely adjacent but spaced from said filing member.

4,683,898

MANICURE FILE AND METHOD OF MAKING SAME

Obrey Lojovich, 455-14th Ave. South, South St. Paul, Minn. 55075

Filed Dec. 27, 1985, Ser. No. 813,938
Int. Cl.[4] A45D *29/04*
U.S. Cl. 132—76.4 **20 Claims**



1. A manicuring file for abrading removal of material comprising:
(a) a contiguous and integral sheet with a perimeter having a plurality of generally straight edges and having
(1) a centrally located main holding section sized to be graspable between an adult humans thumb and an adjacent finger, said holding section being planar and lying in a first plane,
(2) a first flange obtusely folded across a first fold line between the holding section and the perimeter, said first flange being fixed with respect to the holding section in a second plane which is discrete from said first plane, and
(3) a second flange spaced from said discrete from the first flange, said second flange being obtusely folded across a second fold line between the holding section and the perimeter, said second flange being fixed with respect to the holding section in a third plane which is discrete from either of said first or second planes; and
(b) abrading medium on a first surface of each of the flanges, said first surfaces and medium being on the same side of the file.

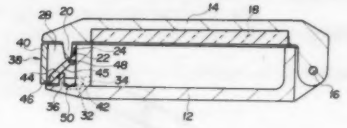
4,683,899

VANITY CASE

Yukitomo Yuhara, Abiko, and Yuji Shioi, Tokyo, both of Japan, assignors to Yoshida Industry Co., Ltd., Tokyo, Japan

Filed Jul. 16, 1985, Ser. No. 755,348
Claims priority, application Japan, Apr. 3, 1985, 60-48690; Apr. 4, 1985, 60-49223; Apr. 5, 1985, 60-49988
Int. Cl.[4] A45D *33/00*
U.S. Cl. 132—82 R **11 Claims**

1. A vanity case comprising:
a receptacle member molded of plastic material for containing cosmetic material;
a cover member molded of plastic material;
said receptacle and cover members being hinged together at respective rear ends thereof;
a recess formed in a front end of said receptacle member and defined by an inner wall, a bottom surface and side walls;
a first latch tongue formed on said cover member;
a second latch tongue formed on said inner wall of said recess;
said first and second latch tongues being engaged with each other by snap action when said receptacle member is closed by said cover member, thereby maintaining said cover member in a closed position with respect to said receptacle member;
a push piece disposed within said recess and being movable therein rearwardly and forwardly, said push piece having



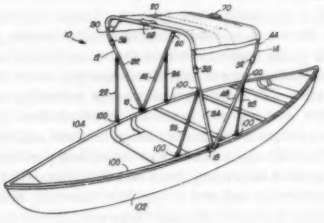
a front wall and an arm integrally formed with said front wall through a thin flexible section, said arm being inclined upwardly toward a rear end thereof, said flexible section permitting said arm to tilt with respect to said front wall, said rear end of said arm being positioned closely adjacent a lower surface of said cover member in said closed position of said cover member; and
a projection extending upwardly from said bottom surface of said recess and positioned spaced from said front wall of said push piece, a lower surface of said arm being in contact with said projection and, upon rearward movement of said push piece, sliding on said projection to tilt said arm whereby said rear end of said arm forces said lower surface of said cover member in upward and forward directions to release engagement between said first and second latch tongues.

4,683,900

BOAT CANOPY

Bruce Carmichael, 750 Madison, Lebanon, Mo. 65536

Filed Sep. 8, 1986, Ser. No. 904,456
Int. Cl.[4] E04H *15/06, 15/36, 15/02*
U.S. Cl. 135—88 **6 Claims**



1. A canopy for use an open-topped vehicle such as a boat, tractor, or the like having two spaced-apart, substantially parallel, side rails, said canopy comprising:
first and second U-shaped support members each including a cross bar and first and second support legs;
first and second coupling means for pivotally intercoupling said first legs and said second legs respectively remote from said cross bars, said coupling means being adapted for coupling with the side rails,
said cross bars being substantially parallel to one another, said coupling means allowing said bars to move alter-

nately between spaced apart and adjacent positions relative to one another;

tarpaulin mean for intercoupling said bars, for limiting the distance said bars may spread apart, and for spanning the area therebetween; and

connecting means including first and second resilient connectors coupled respectively with said first and second members, said connectors being adapted for slidably coupling with the side rails and being under resilient tension when so coupled,

said canopy having an upright position when used on said vehicle whereby said first and second coupling means are coupled respectively to said side rails, said bars are in said spaced apart position with said tarpaulin spanning the area therebetween, said tarpaulin is substantially horizontal relative to said side rails, and said first and second connectors are coupled to said side rails on opposed sides respectively of said coupling means,

said canopy having a collapsed position when used on said boat whereby said first and second coupling means are coupled respectively to the said side rails, said bars are in said adjacent position, and said members are resting on said side rails on the same side of said coupling means,

said canopy being movable from said upright position to said collapsed position when an object strikes one of said bars.

4,683,901

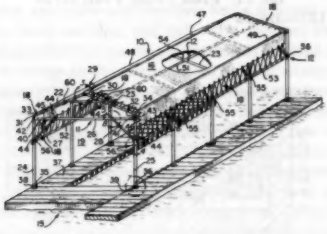
COVER FOR FLOATING BOAT DOCK

Robert W. Mitchell, 1622 Newberry Ave., Columbia, S.C. 29210

Filed Jan. 6, 1986, Ser. No. 816,367

Int. Cl.[4] E04H *15/18, 15/34;* B63B *17/00*

U.S. Cl. 135—97 **5 Claims**



1. Apparatus for sheltering a boat secured in a floating dock, comprising

a top canvas assembly to protect the upper portions of said boat, and

two side canvas assemblies to protect the lower portions of said boat, and

front and rear canvas assemblies to protect the front and rear portions of said boat, respectively, and to provide ready access to the interior of the sheltered area, and

multiple numbers of vertical support means, to support said top canvas assembly and to provide for ease of assembly of said apparatus, comprising

two roof members, joined at their apex by a rotatable coupling and disposed at less than a 90 degree angle to the horizontal plane, and

two vertical members, each joined at its top to the lower end of one of the said roof members by a rotatable coupling and secured at its bottom to the deck of said dock by a detachable shoe, and

a lateral support member each end of which is attached to one of said vertical members by a T-coupling, and

two angular truss members, each of which is attached by collar clamps across the junctures between said lateral support member and each said vertical member, and

horizontal support means, to join and support two or more of said vertical support means as required to cover boats of various lengths, comprising

three horizontal truss members which interconnect the corresponding rotatable couplings of each of said roof members and said vertical members of the multiple numbers of said vertical support means, to provide horizontal stability to said apparatus, and

two or more horizontal roof support members, attached by T-couplings and four way couplings to said roof members, to interconnect said roof members of multiple numbers of said vertical support means, as required by the length of the dock desired, and

two side horizontal members attached by four-way couplings and by U-couplings to said vertical members of multiple numbers of said vertical support means at a mid point of said vertical members to provide horizontal stability to said apparatus and to provide lashing posts for lacing said top canvas and said side canvases to said side horizontal members.

4,683,902

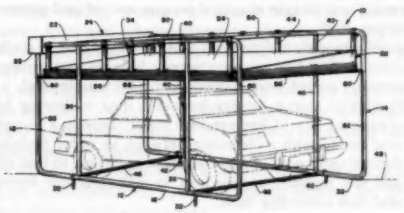
POWERED MOVABLE STORAGE ENCLOSURE

Ralph A. Wilson, 29500-4 Heathercliff Rd., Malibu, Calif. 90265

Filed Mar. 10, 1986, Ser. No. 837,732

Int. Cl.[4] E04H *15/42;* E04B *1/12;* B65D *85/68*

U.S. Cl. 135—105 **6 Claims**



1. A movable storage enclosure for a vehicle or the like comprising:

a frame assembly composed of a pair of side frame sections, said side frame sections located in juxtaposition forming a storage compartment therebetween, each said side frame section having a peripheral edge member, each said peripheral edge member being hollow forming a continuous internal chamber within its respective said frame section;

a housing connected to each said side frame section and extending across said storage compartment, said housing having an interior cavity, said continuous internal chamber of each said side frame section connecting with said interior cavity;

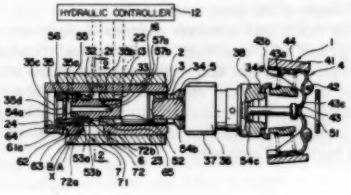
motor means mounted within said interior cavity, a cable assembly connected to said motor means, said cable assembly being movable by activation by said motor means, said cable assembly extending within both said continuous internal chambers; and

a thin, sheet material, flexible cover located within storage compartment, said cover having a plurality of corners, each said corner being connected to said cable assembly, activation of said motor assembly causes said corners to move between an upper position and a lower position, whereby when said corners are moved to said lower position said storage compartment is substantially enclosed and when said corners are moved to said upper position free access is permitted into and out of said storage compartment.

4,683,903
GOVERNOR VALVE

Fumitomo Yokoyama, Anjo; Yoshinari Kuwayama, Tokoname; Mitsugu Tatsuta, Tokyo, and Koujiro Kuramochi, Okazaki, all of Japan, assignors to Aisin Warner Limited and Toyota Jidosha Kabushiki Kaisha, both of, Japan

Filed Aug. 28, 1985, Ser. No. 770,408
Claims priority, application Japan, Aug. 31, 1984, 59-183220
Int. Cl.[4] G05D *13/38*
U.S. Cl. 137—56 **3 Claims**



1. A governor valve, adapted for mounting in a transmission casing, said valve comprising:

an adaptor sleeve having a line pressure supply bore and a governor pressure output bore made therethrough;

a cylindrical governor rotary shaft rotatably fitted into said adaptor sleeve and having a line pressure supply port connected to said line pressure supply bore and a governor pressure output port connected to said governor pressure output bore;

a centrifugal weight mounted on one end of said governor rotary shaft;

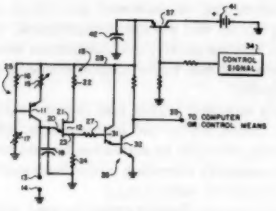
a spool adapted to slide with said governor rotary shaft to connect said line pressure supply bore to said governor pressure output bore according to said weight; and,

said adapter sleeve further having a dust collecting bore connected to said line pressure supply bore in a transmission casing with a clearance between an outer periphery thereof and a wall of said transmission casing, to leak oil in said line pressure supply port to said clearance through said dust collecting bore.

4,683,904
MOISTURE SENSOR

Rumuit Iltis, La Jolla, Calif., assignor to Ranya L. Alexander, San Diego, Calif.

Filed Aug. 30, 1984, Ser. No. 646,640
Int. Cl.[4] A01G *25/16*
U.S. Cl. 137—78.3 **14 Claims**



1. A moisture sensor for detecting percentage moisture in a substance, said sensor being adapted to be coupled to an indication means and comprising:

a source of electrical power;

a variable frequency oscillator coupled to said power source and having a pulsed output, said oscillator comprising:

a first transistor having an emitter and a first base; and

a first variable resistor coupled between said power source and said emitter, the charging current to said capacitance means being governed by said first variable resistor;

capacitance means in said oscillator, said capacitance means having electrodes of fixed size and spacing, the capacitance value of said capacitance means being responsive to the dielectric constant between said electrodes, said dielectric constant being a function of the percentage moisture between said electrodes, the pulse-to-pulse interval of the output pulses of said oscillator being linearly related to the capacitance value of said capacitance means;

a constant current generator connected to said oscillator and providing a constant charging current to said capacitance means, said constant current generator comprising:

a second transistor having a base, a collector and an emitter; and

a second variable resistor connecting said base to ground, said base being coupled to said power source;

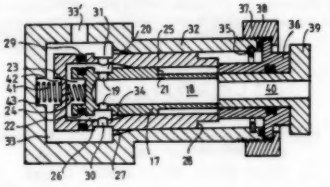
means for coupling the output of said oscillator to said indication means to indicate relative moisture content of the substance;

whereby said first variable resistor controls oscillation rate and said second variable resister is adapted to be set to establish linearity between moisture percentage and the capacitance of said capacitance means.

4,683,905
FLUID DISTRIBUTION CONNECTOR, IN PARTICULAR FOR HOSPITALS

Jean-Louis Vigneau, Varilhes; Pierre Trenque, Ramonville St Agne, and Bruno Rivoire, Toulouse, all of France, assignors to Duffour et Igon S.A. (D.I.), Toulouse, France

Filed Jan. 15, 1986, Ser. No. 819,029
Claims priority, application France, Jan. 18, 1985, 85 00681
Int. Cl.[4] F16K *15/28;* **F16L** *37/28*
U.S. Cl. 137—329.1 **3 Claims**



1. A fluid distribution connector formed of a connector body having a fluid intake communicating with an intake chamber and means to assure the circulation of fluid between said intake and a connector tip only when said tip is introduced into the connector body, said connector comprising:

a jacket having a rear chamber adapted for communicating with said fluid intake, a piston slidably positioned within said jacket, said piston including an axial blind hole therein for providing a circulation duct for the fluid, said axial blind hole being open at its front and closed at its rear and including radial bore adjacent said rear, said piston slidable in said jacket between a closed position in which it is urged by the pressure of the fluid against a stop with said radial bores out of fluid communication with said rear chamber and an open position in which introduction of said connector tip forces said piston toward said rear chamber with said radial bores in fluid communication with said rear chamber,

said jacket including radial bores therein for fluid communication between said rear chamber and said intake chamber and slidably positioned in a cylindrical lengthening piece of said connector body between a safety position in which said jacket is urged by the pressure of the fluid against a safety stop with said rear chamber out of fluid communi-

cation with said intake chamber of said connector body and an open position in which said rear chamber is in fluid communication with said intake chamber of said connector body, and

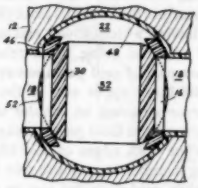
removable pin means for sliding said jacket into and maintaining said jacket in its open position, said pin means comprising said stop for said piston in its closed position.

4,683,906

TRUNNION TYPE BALL VALVE

Ronald G. Butler, Lancaster; John R. Lehman, Columbia; Douglas S. Gray, Lancaster, and Wayne R. Houck, Columbia, all of Pa., assignors to ITT Corporation, New York, N.Y.

Filed Nov. 29, 1985, Ser. No. 802,873
Int. Cl.[4] F16L *7/00*; F16K *31/44*
U.S. Cl. 137—375 **8 Claims**



1. A ball valve comprising a valve body having flow passages formed therein and a cavity formed therebetween, a ball valve member having a bore extending therethrough, said ball valve member being mounted in said cavity for rotation between open and closed positions, a pair of valve seat members located in said cavity between said valve body member and said ball valve, said valve seat members being movable relative to said valve body member, said ball valve member having a surface configuration for exerting substantially no load on said valve seat members in its open position and for compressing said valve seat member against said valve body member in the closed position, said surface configuration including first surface portions adjacent each end of said bore, said first surface portions being generally complementary to the adjacent surface of said valve seat members and a second surface portion of increasing projection extending between said first surface portions, said first surface portions being frusto-conical surfaces and said second surface portion being generally spherical.

4,683,907

VALVE FOR THE INTERCEPTION AND REGULATION OF FLOW WITH A FIXED TUBULAR SEALING ELEMENT

Vincenzo Brugnoli, Viterbo, Italy, assignor to Francesco Amici, Rome, Italy

Filed Mar. 24, 1986, Ser. No. 842,940
Int. Cl.[4] F16K *31/18, 31/128*
U.S. Cl. 137—414 **9 Claims**

1. A valve for controlling the flow of a fluid, said valve comprising:

a hollow body internally subdivided by a baffle member into first and second chambers, said baffle member including a tubular extension which is perforated by a plurality of openings and which extends into said second chamber;

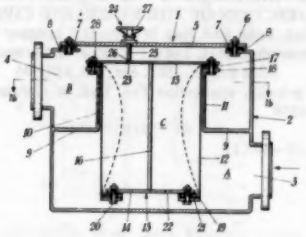
an inlet in said body through which said fluid may enter said first chamber and an outlet in said body through which said fluid may exit from said second chamber;

an open ended flexible tubular sealing element surrounded by said tubular extension and extending between said first and second chambers;

first and second closure elements arranged respectively in said first and second chambers to close the ends of said tubular sealing element and to cooperate therewith in defining a third chamber interposed between said first and second chambers;

a first port in said first closure element through which a portion of the fluid in said first chamber may flow into said third chamber, and a second port in said second closure element through which the said portion of fluid may flow from said third chamber into said second chamber; and

regulator means for varying the fluid pressure in said third chamber by controlling the flow of fluid through said second port, whereupon when the fluid pressure in said first and third chambers is equalized, said flexible sealing element is caused to expand outwardly against said tubular extension to block said openings and prevent fluid flow



therethrough from said first chamber to said second chamber, and when the fluid pressure in said third chamber is lowered beneath that in said first chamber, said flexible tubular sealing element is caused to collapse inwardly away from said tubular extension, thereby allowing fluid flow from said first chamber through said openings to said second chamber.

2. A valve according to claim 1 wherein said first and second closure elements comprise rigid discs held in an axially aligned mutually spaced relationship by an elongated connecting member extending therebetween.

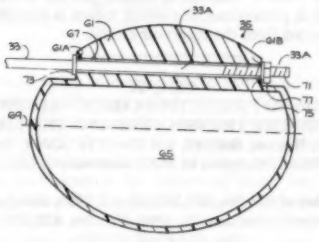
7. A valve according to claim 6 wherein the other end of said threaded stem constitutes a pin-type sealing element for opening and closing said second port.

4,683,908

ECCENTRIC FLOAT APPARATUS

Daniel J. Brewer, 4211 Austin Ave., Brownwood, Tex. 76801

Filed Nov. 7, 1986, Ser. No. 928,030
Int. Cl.[4] F16K *33/00, 31/18*
U.S. Cl. 137—426 **9 Claims**



1. An apparatus for controlling a float operated valve means of a water tank of a toilet for regulating the water level in the tank, comprising:

a float member capable of floating in water,

said float member having a central axis along a given dimension,

said float member having an aperture for receiving one end

of a rod means with the other end of the rod means being connectable to the valve means in the water tank,

said aperture being offset from said central axis whereby the length of the rod means when located in said aperture is offset from said central axis,

when said rod means is located in said aperture, said float member and hence the portion of said float member between said aperture and said central axis are rotatable about said rod means whereby said float member can be secured to said rod means to locate said portion of said float member between said aperture and said central axis at different angular positions relative to said rod means.

4,683,909

RESERVOIR LOADING VALVE WITH PRESSURE PROTECTION OF THE RESERVOIR CIRCUIT

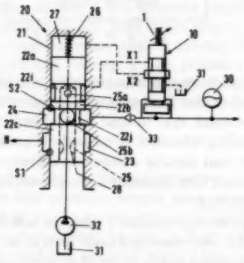
Kurt Wittich, Lohr, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed Feb. 5, 1985, Ser. No. 698,404

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1984, 3404598

Int. Cl.[4] F16K *31/12*

U.S. Cl. 137—505.11 **17 Claims**



1. A reservoir loading system which includes a switching valve and a pre-control valve subject to pressure of a reservoir circuit, the pre-control valve controlling the switching valve in accordance with the reservoir circuit pressure, the switching valve comprising:

piston means for controlling a connection between a pump and a working fluid circuit, the piston means having a blind bore and a first transverse bore through which the reservoir circuit is supplied with fluid pressure; and

a flow control orifice means within the blind bore for controlling the volume of fluid provided to the reservoir circuit;

whereby when a reservoir is loaded and the working fluid circuit is pressurized, the piston means is completely disconnected from the reservoir circuit.

4,683,910

HIGH-SPEED PROTECTIVE CHECK VALVING FOR PRESSURE TRANSDUCERS AND THE LIKE

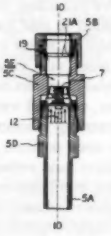
Richard A. Benson, Bedford, and David H. Alden, Burlington, both of Mass., assignors to MKS Instruments, Inc., Andover, Mass.

Continuation of Ser. No. 607,384, May 4, 1984, abandoned. This application Jan. 21, 1986, Ser. No. 821,508

Int. Cl.[4] F16K *17/28*

U.S. Cl. 137—519 **1 Claim**

1. A high-speed protective check valve for pressure transducers and the like comprising a valve body having two body members provided respectively with inlet and outlet ports communicating with an interior fluid flow passageway which extends along a substantially vertical axis therethrough, one of said body members having therein one part of said passageway and having a narrow circular edge defining a valve seat normal to said axis, said valve seat being formed by stepped inner surfaces of said one of said body members which merge at substantially 90 degrees at the site of said narrow circular edge, a free single-piece molded valving member of elastomeric material of about 70 durometer hardness contained within and mechanically unconnected in relation to said body and guided about its exterior for short reciprocating movements along said axis between an upper flow-blocking position in which an exterior valving portion thereof engages and seals with said seat and a lower position below said upper position and at which said member is axially displaced from said seat and fluid may flow around said member and through said seat and said passageway, said exterior valving portion of said valving member having a truncated conical exterior configuration without mold lines tapering symmetrically about said axis and with a slope of about 45 degrees from a larger cylindrical lower end of said valving member to a smaller upper end portion which is of lesser diameter than said seat and fits therethrough to allow said seat to make essentially a line-contact seating and sealing with said exterior portion, said larger cylindrical end of said valving member having a blunt lower end surface substantially normal to said axis and being fitted relatively loosely radially within another part of said passageway in an accommodating recess at the inner upper end of the other of said body members, said recess having an annular shoulder at the bottom thereof and around the fluid passageway therethrough disposed for interference with edges of said blunt lower end surface of said valving member to establish said lower position for said valving member, said shoulder having relief passageways therethrough to permit by-pass of fluid around said valving member when said blunt end surface rests on said shoulder, and said blunt end surface being in position within said recess to have relatively large amounts of onrushing fluid headed upwardly toward said seat impinge perpendicularly upon it and thereby propel said valving member upwardly along said axis until said exterior portion seats and seals itself in an essentially line-contact engagement with said seat, said narrow circular edge defining said valve seat being of a diameter which causes it to engage said exterior valving portion at about one-third of the distance down from said smaller end portion to said larger cylindrical end when said valving member is seated therewith, and said smaller end portion of said valving member tapering narrower upwardly at a relatively small angle from said exterior valving portion to the free upper end thereof and being of sufficient axial length and diameter to extend through said seat irrespective of the axial position of said valving member and to prevent the valving member from tilting excessively about said axis asnd becoming jammed, said valving member being urged downwardly toward said shoulder by gravity but being of such light weight in relation to forces developed by impingements of said upwardly-onrushing fluid upon said larger end thereof and by greater pressures below said valving member than above it as to allow said valving member to be propelled upwardly into a seated and closed condition rapidly when the onrush commences and, thereby, to protect against passage of significant bursts of fluid upwardly therethrough, said two body members being mated by way of complementary external and internal threading of substantially constant diameter coaxial with said axis and said passageway and being



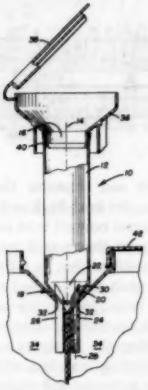
relatively rotatable to adjust the axial separations between said first and second positions and, thereby, the sensitivity of said check valve to pressures which will close the valve.

4,683,911

FLUID PROPORTIONING DEVICE

Ronald A. Mayes, Beaumont, Tex., assignor to Helena Laboratories, Beaumont, Tex.

Filed Jan. 8, 1986, Ser. No. 817,004
Int. Cl.[4] C12M *1/00*
U.S. Cl. 137—561 A **6 Claims**



1. A fluid proportioner comprising:

an elongation first tubular member having an open-end and a closed-end forming a single cavity therein, said first tubular member defining a first longitudinal axis, wherein the closed-end of said elongated first tubular member is formed with side-walls converging at an acute angle to said first-longitudinal axis;

at least two elongated second tubular members each having a cross-sectional area less than the cross-sectional area of the first tubular member, said at least two second tubular members affixed to, extending and opening into the converging closed-end of the first tubular member, each of said elongated second tubular members defining a second longitudinal axis throughout its entire length, each said second longitudinal axis substantially parallel to the first longitudinal axis, and further wherein the ends of the at least two second tubular members interior of the first tubular member are cut at an angle acute to the second longitudinal axis and generally equal to the angle of convergence of the sidewalls of the first tubular member.

4,683,912

ROTARY COUPLER FOR A ROBOT

Harry A. Dubrosky, Livonia, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 6, 1986, Ser. No. 836,553
Int. Cl.[4] F16L *39/04*; B25J *17/02*
U.S. Cl. 137—580 **22 Claims**

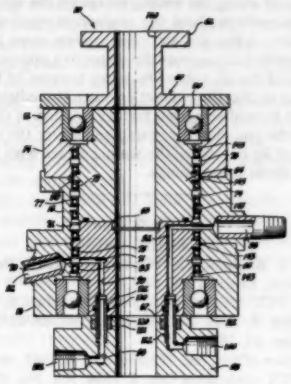
1. A rotary coupler for a robot arm comprising:

an outer shell having an inner bore fluidly connected with the outside of said outer shell via a first conduit;

a first inner shell rotatably mounted within said outer shell having a first generally annular sealed clearance with said outer shell, said annular clearance being fluidly connected with said first conduit, and said first inner shell having a first eccentric axial bore fluidly connected with said annular clearance and said eccentric axial bore having a concentric annular gap;

at least a second inner shell fixedly connected with said first inner shell and having an extension of said first eccentric axial bore aligned therewith; and

a tubular insert sealed by a surrounding O-ring captured in said concentric annular gap adjacent an end of said tubular



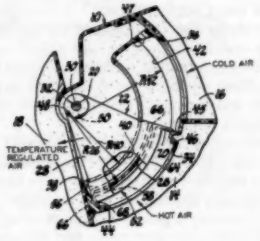
insert, said tubular insert being mounted within said first eccentric axial bore whereby said second inner shell may be removed from its fixable connection with said first inner shell.

4,683,913

ROTARY AIR VALVE SEAL ARRANGEMENT

Donald E. Hoffman, Java Center, N.Y., and David B. McDonald, Königstein, Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 15, 1986, Ser. No. 918,995
Int. Cl.[4] F17D *3/00*
U.S. Cl. 137—625.4 **2 Claims**



1. In combination, a case having a pair of air ducts with adjacent openings through which air may flow, a rotary air valve mounted in the case for rotatable movement about an axis so as to selectively cover the openings to prevent air flow therethrough, the openings each having a peripheral portion extending thereabout in the respective ducts, the air valve having a peripheral edge that is sealed with respect to the peripheral portion about the respective openings so as to sealingly close same when the air valve covers same, both the peripheral portion about the openings and the peripheral edge on the air valve having corresponding straight sections extending parallel to the axis and corresponding curved sections extending about the axis at certain fixed radii, characterized by the peripheral portions about the openings facing outwardly and inwardly in opposite radial directions relative to the valve axis, flexible elastomeric seal means extending along and mounted on the peripheral edge of the air valve for flexibly engaging the peripheral portion about the respective openings

when the air valve covers same so as to sealingly close same, the curved sections of the peripheral portions about the openings having a different fixed radii curvature whose axes are parallel and offset from the axis about which the air valve rotates so that a predetermined contact pressure is established between and along the sealing means on the air valve and the peripheral portion about the respective openings to provide tight sealing when the air valve covers same but as the air valve is rotated to uncover the respective openings the peripheral edge of the air valve lifts away because of the respective offset axes so that the contact pressure immediately diminishes to zero to thereafter permit further rotation of the air valve to uncover the one closed opening and cover the other opening uninhibited by contact of the sealing means with the peripheral portions about the openings.

4,683,914

SLIDE VALVE

Michael J. Brisland, 12, Windermere Road, Peniston, South Yorkshire, England S30 6HL

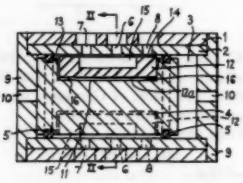
PCT No. PCT/GB84/00338, § 371 Date Jun. 6, 1985, § 102(e) Date Jun. 6, 1985, PCT Pub. No. WO85/01558, PCT Pub. Date Apr. 11, 1985

Continuation of Ser. No. 757,288, Jun. 6, 1985, abandoned. This PCT application Oct. 4, 1984, Ser. No. 877,702

Claims priority, application United Kingdom, Oct. 6, 1983, 8326702

Int. Cl.[4] F15B *13/02*

U.S. Cl. 137—625.48 **9 Claims**



1. A slide valve comprising:

a valve body having a plurality of valve ports therethrough, at least one of which is an inlet port;

a slide slidably mounted within said valve body to at least two defined positions for controlling opening, interconnection, and closing of said valve ports, said slide including a recess thereon; and

a valve block floatingly located within said recess and sized to provide a clearance therewith sufficient to permit fluid flow so that the rear face of the valve block is exposed to fluid pressure applied through said inlet port, said valve block including a gallery communicating with and being shaped to provide interconnection between said inlet port and at least one other of said valve ports, and at least one sealing surface for sealing off at least one of said other valve ports in at least one of said defined positions of said slide, in which said defined position said valve block is moved solely by the pressure applied through said inlet port to its rear face such that said sealing surface is urged against and closes said at least one of said other valve ports.

4,683,915

PILOT CONTROLLED VALVES

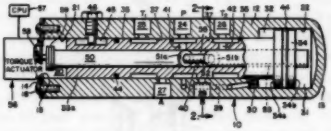
Harry M. Sloate, 526 Lakeshore Dr., Barrington, Ill. 60010

Filed Feb. 25, 1985, Ser. No. 705,076

Int. Cl.[4] F15B *13/043*

U.S. Cl. 137—625.63 **15 Claims**

1. For use in a valve housing having a first end with an opening and a second closed end, an axial bore extending between the first and second ends and a plurality of ports connected to the axial bore: a valve body that is laterally displaced within the axial bore by fluid pressure to open and close one or more ports, the valve body having two outer lands and at least one inner land, a first outer land being positioned adjacent to the first end of the valve housing and a second outer land being positioned adjacent to the second end of the valve housing, a cylindrical, lateral control bore extending the length of the valve body and being used to transmit both high and low pressure fluid for controliing the lateral displacement of the valve body, and first and second radial bores axially spaced apart between the two outer lands and coupled to the lateral control bore, and a controll rod extending through the opening in the first end of the valve housing, inserted in the



lateral control bore and rotatable therein, the control rod having a passageway for both high and low pressure fluid that begins within the lateral control bore and extends to the end of the control rod nearest the second end of the valve housing, the passageway shaped so that in a first angular position the control rod covers both the first and second radial bores and neither radial bore is coupled to the passageway, in a second angular position the control rod uncovers the first radial bore, so that it is coupled to the passageway leading to the second end of the valve housing, and in a third angular position the control rod uncovers the second radial bore so that it is coupled to the passageway leading to the second end of the valve housing.

4,683,916

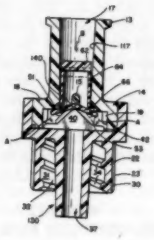
NORMALLY CLOSED AUTOMATIC REFLUX VALVE

Kenneth C. Raines, Bethlehem, Pa., assignor to Burron Medical Inc., Bethlehem, Pa.

Filed Sep. 25, 1986, Ser. No. 911,419

Int. Cl.[4] F16K *15/14*

U.S. Cl. 137—854 **17 Claims**



1. A valve device comprising:

a first body element having an input opening therethrough;

a second body element which complements said first body element and having an outlet opening therefrom;

a resilient valve disc mountable between said first and second body elements;

first means with one body element for supporting the disc at the center thereof;

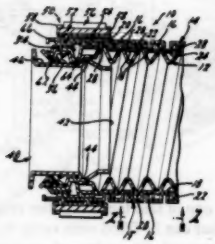
means with the other body element for holding said disc firmly against said first means in such a manner that said disc is restrained from sideways movement; and

means adjacent said valve disc for engagement by a syringe to open said normally closed disc to permit injection and aspiration of fluids through the device.

4,683,917
FLEXIBLE PRESSURE-CONFINING CONDUIT ASSEMBLY

Donald D. Bartholomew, Marine City, Mich., assignor to Proprietary Technology, Inc., Southfield, Mich.

Filed Aug. 28, 1985, Ser. No. 770,233
Int. Cl.[4] G05D *11/00*
U.S. Cl. 138—121 **10 Claims**



1. A tubular conduit assembly for conveying a pressurized fluid, comprising:

a flexible, thin-walled inner tube for conveying said pressurized fluid therethrough, said inner tube being helically corrugated and having an apex at each corrugated;

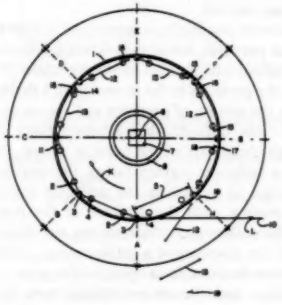
a flexible outer tube disposed coaxially around said inner tube, said outer tube being constructed from at least one helically-wound member corresponding with and engaging the helical corrugation of said inner tube so that the apex of the helical corrugation of said inner tube nest inside the helical corrugation of said outer tube;

said plastic inner tube being sufficiently flexible and thin-walled to deform in response to the pressure of said pressurized fluid such that said corrugations in said thin-walled inner tube substantially expand to form a substantially non-corrugated sealing layer on the interior of said outer tube and said inner tube returning to said corrugated configuration when said pressurized fluid ceases to flow through said conduit.

4,683,918
METHOD AND APPARATUS FOR PRODUCING BALING WIRE FOR TYING TOGETHER BUNDLED ITEMS

Rene Maeder, Frauenfeld, and Albin Herzog, Matzingen, both of Switzerland, assignors to Gamper & Co. AG, Munchwilen, Switzerland

Filed Dec. 9, 1985, Ser. No. 806,968
Claims priority, application Switzerland, Dec. 24, 1984, 6176/84
Int. Cl.[4] B21F *45/16*
U.S. Cl. 140—73 **34 Claims**



1. A method for producing baling wires having enlarged tips for tying bundled items and the like comprising the following steps:

(1) supplying a strip of continuous substantially linear wire,

(2) conveying said strip of continuous wire into an at least substantially vertical orientation,

(3) clamping at least a portion of said strip of continuous wire in a clamping zone as said wire strip is conveyed into its at least substantially vertical orientation,

(4) conveying said wire while in its at least substantially vertical orientation through a first melting zone and heating at least a portion thereof at an intermediate location therealong to its melting point to sever a linear segment of said wire from said strip of continous wire,

(5) said heating forming an enlargement at one tip end of said linear wire segment, and

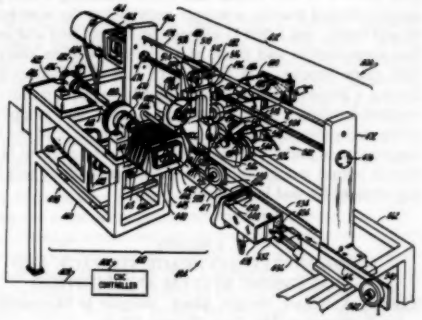
(6) thereafter conveying said linear wire segment through a second melting zone and heating the opposite tip end of said linear wire segment while in an at least substantially vertical orientation to its melting point to form an enlargement at said opposite tip end,

(7) said enlargement being formed at each respective tip end of said linear wire segment as said tip ends point at least substantially vertically.

4,683,919
APPARATUS AND METHOD FOR FABRICATING A HIGH VOLTAGE WINDING FOR A TOROIDAL TRANSFORMER

Herbert J. Macemon, Versailles; Randall L. Schlake; John L. Fisher, both of Lexington, all of Ky.; Clair E. Platt, and Hubert L. R. Mohney, both of Bronson, Mich., assignors to Kuhlman Corporation, Troy, Mich.

Continuation of Ser. No. 662,467, Oct. 17, 1984, abandoned.
This application May 15, 1986, Ser. No. 867,411
Int. Cl.[4] B21F *3/00*
U.S. Cl. 140—92.2 **87 Claims**



1. An apparatus for winding wire into pie-shaped coil bundles, said apparatus comprising:

a winding mandrel rotatable about a mandrel axis and providing a bottom wall and two side walls defining an annular cavity for containing multiple turns of the wire, said side walls converging radially outwardly toward the opening to said annular cavity at at least one portion of said annular cavity;

guide means for axially positioning the wire within said annular cavity as said winding mandrel rotates to wind the wire into said annular cavity, said guide means including a positioning portion cooperating with the wire and extending between said two side walls and into said annular cavity for placing the wire at predetermined axial positions within said annular cavity; and

adjusting means coupled to said guide means for adjusting the location of said positioning portion of said guide means within said annular cavity to adjust the predeter-

mined axial positions of the wire within said annular cavity.

4,683,920

BANDING MACHINE

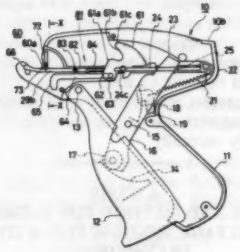
Akira Furutsu, Tokyo, Japan, assignor to Japan Banc'k Co., Ltd., Tokyo, Japan and Ben Clements & Sons, Inc., South Hackensack, N.J.

Filed Dec. 12, 1985, Ser. No. 808,398

Claims priority, application Japan, Jan. 16, 1985, 60-4049; Mar. 29, 1985, 60-63254

Int. Cl.[4] B21F *15/04*

U.S. Cl. 140—93 A **3 Claims**



1. A banding machine of the type adapted to support an assembly of banding elements which are individually served and fed for use, each banding element including a body with opposite ends which can be folded at a bending portion to interlock the opposite ends to form a closed band, the banding machine comprising a frame having a nose portion and having lever means for individual severed banding elements to the nose portion of said frame, said frame including a first guide groove formed therein, a stopper provided at the nose portion of said frame, and a first U-shaped clip having first and second legs supported in said frame at a selected position along said first guide groove, said first leg of said first U-shaped clip having a projection which is retractable when an individual severed banding element is moved toward said stopper and along said projection, said projection acting to hold the bending portion of said individual severed banding element in position to permit interlocking of said opposite ends of said banding element by said lever means.

4,683,921

CARBONATED BEVERAGE STORAGE AND DISPENSING SYSTEM AND METHOD

Timothy A. Neeser, Savage, Minn., assignor to Minnesota Valley Engineering, Inc., New Prague, Minn.

Filed May 5, 1986, Ser. No. 859,311

Int. Cl.[4] B65B *3/04*; B67C *7/00*

U.S. Cl. 141—1 **6 Claims**

5. A method for storing and dispensing carbonated beverages comprising the steps of:

(a) providing at least two syrup supply tanks for each type of syrup to be dispensed, each tank having a drain connection at the bottom thereof and a fill connection near the top thereof;

(b) providing a source of carbon dioxide and a source of water;

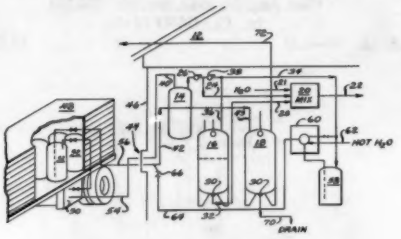
(c) communicating syrup from one of said syrup tanks, via said drain connection, to said mixing valve for mixing carbon dioxide, syrup and water to dispense carbonated beverages on demand;

(d) filling the other of said tanks with syrup by:

(i) communicating said other tank with a transportable syrup supply tank,

(ii) venting said other tank to permit escape of air displaced by syrup;

(e) cleaning the filling means and the said other tank prior to the filling operation;



whereby while one of said tanks supplies syrup to the mixing valve, the other can be filled with syrup to permit substantially uninterrupted dispensing of carbonated beverages merely by switching back and forth between tanks.

4,683,922

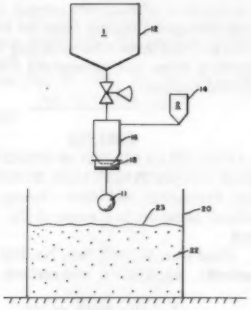
PARTICLE DEFLECTOR AND METHOD OF DISTRIBUTING DISSIMILAR PARTICLES

David M. Harrison, Chester; Robert P. Gentili, Richmond, and George N. Bellucci, Hopewell, all of Va., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jan. 24, 1986, Ser. No. 822,345

Int. Cl.[4] B65B *1/04*

U.S. Cl. 141—9 **12 Claims**



10. A method of distributing a mixture of dissimilar particles comprising the step of:

feeding a stream containing a mixture of at least two types of dissimilar particles, the stream flowing substantially about a longitudinal axis parallel to the direction of the stream;

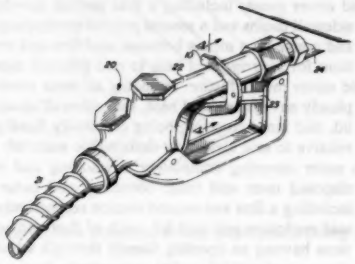
deflecting the particles in the stream with a deflector located between the stream of particles and the receptacle with a deflector; the deflector being substantially coaxial with the longitudinal axis of the particle stream, the deflector having a deflector surface facing the oncoming stream, the distance of a point on the deflector surface from the axis increasing with the distance of the point from the outlet, the deflecting surface having an effective diameter which is the diameter of a circle having a radius equal to the greatest distance from the axis of a point on the deflector surface, and the cross-sectional area of the stream defining an area of from about ¼ to about 4 times the area of a circle having an effective diameter.

4,683,923

CLIP FOR USE WITH GASOLINE PUMP DISPENSING HANDLE

Charles M. Harris, 9070 Alena Ct. NW., North Fort Myers, Fla. 33903

Filed May 27, 1986, Ser. No. 866,755
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—392 **4 Claims**



1. A clip for holding the lever of a gasoline pump dispensing handle in open gasoline dispensing position, said clip being formed as a thin flat device of uniform thickness comprising

a rear shank approximately 1$\frac{1}{10}$ inches in length;

a pair of identical arms extending approximately 1$\frac{1}{2}$ inches from the opposite ends of the rear shank with the arms forming between themselves an angle of approximately 40 degrees; and

a serrated row of identical flat-topped teeth lying along the inner edge of each of the clip's two arms,

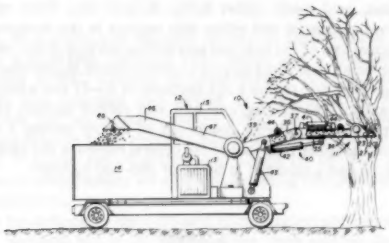
the flat tops of each serrated row of teeth lying in a common plane, and the two planes containing said flat tops intersecting each other at an angle of approximately 40 degrees.

4,683,924

TREE AND BRUSH CUTTING AND CHIPPING APPARATUS

Billie G. Cornelius, 15515 Lee Rd., Houston, Tex. 77032

Filed Mar. 7, 1986, Ser. No. 837,296
Int. Cl.[4] A01G *23/08*
U.S. Cl. 144—3 D **22 Claims**



1. Apparatus for cutting and chipping trees and brush comprising:

a hollow tubular housing having side walls and an open front and rear and adapted to be secured onto the boom of a vehicle for contacting trees or brush to be cut and chipped,

a cutting member movably secured at the front of said housing and extending outwardly therefrom,

said cutting member being movable to cut the trees and brush and the like and then feed the cut material into said housing,

a rotary chipping member secured within said housing transversely between said side walls and spaced from said cutting member to receive the cut material,

said chipping member being rotatable to reduce the cut material to chip size and feed the chips through the open rear end of said housing,

means controllable from the vehicle for extending, retracting, and steering said boom to move said housing into contact with trees or brush to be cut,

means controllable from said vehicle for moving said cutting member, and

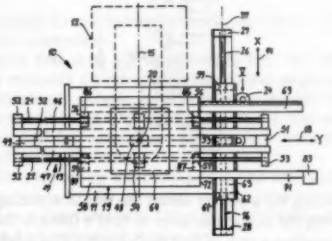
means controllable from said vehicle for rotating said chipping member.

4,683,925

JIG CARRIAGE FOR A RECESSING AND SHAPING MACHINE USED IN WOODWORKING

Anton Koukal, Bosslerstrasse 18, D-7321 Zell/Aichelberg, Fed. Rep. of Germany

Filed Mar. 5, 1984, Ser. No. 586,253
Claims priority, application Fed. Rep. of Germany, Mar. 4, 1983, 3307808; Sep. 13, 1983, 3333099
Int. Cl.[4] B27C *5/06*
U.S. Cl. 144—145 R **15 Claims**



1. A coordinate carriage means for a routing machine whereby a workpiece is moved in a working plane in two mutually perpendicular coordinate directions along a predetermined routing path, the coordinate carriage means comprising a longitudinal carriage means, control means for reciprocatingly moving the longitudinal carriage means in an X direction, guide means for guiding the reciprocating movement of the longitudinal carriage means, said guide means being integral with a frame of the routing machine, a cross carriage means for carrying a workpiece, means for reciprocatingly moving the cross carriage means in a Y direction on the longitudinal carriage means the longitudinal carriage means further comprises two horizontally spaced lightweight hollow members extending parallel in the Y direction, said two hollow members being joined together to form a torsion and bending-resistant frame, bearing means for guiding said torsion and bending-resistant frame said bearing means being spaced at intervals from each other on a guide shaft means laterally secureable to a worktable of the routing machine and located beneath a level of a top of the worktable, and supported at an opposite side of the worktable by a support roller means against a support rod means fastened laterally to said support roller means and extending parallel to the guide shaft means, said cross carriage displaceably guided in the Y direction on longitudinal carriage means includes two laterally spaced hollow members disposed in parallel to the Y direction, said spaced hollow members of said cross carriage means being permanently connected together by a table plate crossing above the longitudinal carriage means hollow members with a slight clearance in a range of 0.5 to 1 cm, whereby the hollow members of said cross-carriage means extend laterally at a distance from corresponding adjacent hollow members of the longitudinal carriage means, the guide means supporting the cross carriage means and guiding the cross carriage means on the longitudinal carriage means includes two guide shafts

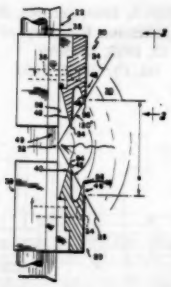
extending in the Y direction, and bearing block means for the respective guide shafts and further bearing block means for displaceably mounting the cross carriage means in spaces remaining between the hollow members of the longitudinal carriage means and cross carriage means, whereby the guide shaft means extend approximately at a level of a horizontal longitudinally extending center plane of the hollow members of the longitudinal carriage means.

4,683,926

SLICER DOGS FOR THIRDS AND QUARTERS

George Well, Mississauga, Canada, assignor to David R. Webb Co., Inc., Edinburgh, Ind.

Filed Apr. 1, 1986, Ser. No. 846,894
Int. Cl.[4] B27L *5/06*
U.S. Cl. 144—178 14 Claims



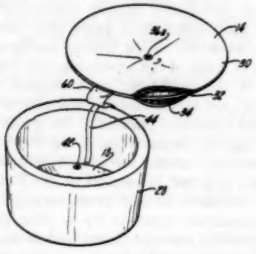
1. A dog for a veneer slicer, the dog comprising means for mounting the dog to the slicer to hold a flitch to the slicer, the dog including a row of first teeth having first edges extending generally longitudinally of the flitch along a first line for engagement in the flitch to assist in holding the flitch on the slicer so that veneer can be sliced from it, and a row of second teeth having second edges extending generally longitudinally of the flitch along a second line for engagement in the flitch to assist in holding the flitch on the slicer.

4,683,927

TOY BOX WITH REMOVABLE COVERING

Joan B. Pyzer, 16389 E. Rutherland, Southfield, Mich. 48076

Filed May 4, 1981, Ser. No. 260,458
Int. Cl.[4] B65D *1/22, 1/40, 25/34, 51/00*
U.S. Cl. 150—52 R 15 Claims



1. A container assembly suitable for use as a toy box, comprising:

a container having a base and sidewall means extending upwardly from said base to form an enclosure having an open top:

a lid installable on said container for covering said open top of said enclosure;

said sidewall means and said base each being defined by elastically deformable material readily yieldable to the weight of a child falling thereon; and

flexible cover means on said sidewall means and said base for protectively enclosing each of the latter from the surrounding environment;

said cover means including a first portion enveloping said sidewall means and a second portion enveloping said base, and connecting means between said first and second portions for securing said base to said sidewall means;

said cover means further including an inner covering completely enveloping said base, said sidewall means and said lid, said inner covering being essentially fixedly disposed relative to said elastically deformable material; and

an outer covering completely enveloping and removably disposed over said inner covering, said outer covering including a first and second section respectively covering said enclosure and said lid, each of first and second sections havong an opening therein through which said enclosure and said lid may be respectively drawn and means for normally closing each said opening.

4,683,928

PNEUMATIC TIRE TREAD WITH A CENTRAL ZONE AND LATERAL ZONES OF DIFFERENT HARDNESS

Mitsuhisa Yahagi, Sayama, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Filed Dec. 18, 1985, Ser. No. 810,458
Claims priority, application Japan, Dec. 27, 1984, 59-196213
Int. Cl.[4] B60C *1/00, 11/00*
U.S. Cl. 152—209 R 3 Claims

1. A pneumatic tire for heavy load vehicles comprising; a tread rubber and a tread reinforcing layer superimposed about a crown portion of a carcass extending between a pair of bead portions; said tread rubber being divided into three rubber portions of central and either side regions in the direction of rotational axis of the tire; and said rubber portion of the central region being composed having a cut resistance higher than that of the either side region a JIS hardness of 63–67 and a strength at break of 240–280 kg/cm^2 and said rubber portion of the either side region being composed of rubber having a wear resistance higher than that of the central region, a JIS hardness of 58–62 and a strength at break of 280–320 kg/cm^2.

4,683,929

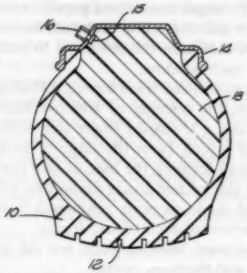
DEFLATION-PROOF PNEUMATIC TIRE WITH ELASTOMERIC FILLINGS

Ransome J. Wyman, 821 Camino Calibri, Calabasas, Calif. 91302

Continuation of Ser. No. 505,042, Sep. 9, 1983, abandoned. This application Aug. 29, 1985, Ser. No. 771,383
Int. Cl.[4] B60C *7/00*
U.S. Cl. 152—313 14 Claims

1. A flat-free tire comprising a tire casing and a substantially void-free polyurea-containing polyurethane elastomer filling material having a Durometer hardness of at least 20A and confined, at least in part, by said casing, said filling material including at least 10 volume percent extender oil and being the

product of a reaction of a polyol, and organic polyisocyanate and water, in amounts and under conditions sufficient to produce carbon dioxide dissolved in said elastomeric filling material.

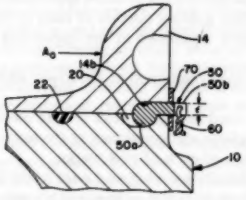


4,683,930

LOCKING CONFIGURATION FOR A WHEEL RIM FLANGE RETAINING RING

Paul A. Elam, Akron, and Jack W. Keller, Mogadore, both of Ohio, assignors to Goodyear Aerospace Corporation, Akron, Ohio

Filed Oct. 31, 1985, Ser. No. 793,351
Int. Cl.[4] B60B *25/18*
U.S. Cl. 152—410 **2 Claims**



1. In a wheel rim assembly having an inboard bead flange and a separable outboard bead flange and a retaining ring having a split defining circumferentially oriented terminal ends, said retaining ring having an inboard facing bulbous portion and an outboard facing flange portion, the inboard facing portion being received within an annular groove in the rim to secure the separable bead flange on the rim, an improved configuration for a locking retaining ring comprising in combination:

a tab defined in the outboard facing flange portion of each terminal end in the retaining ring, each said tab having a drilled bore through the material comprising the tabs;

a buckle member having a pair of longitudinally oriented and spaced-apart apertures defining a rib between them, which rib establishes a predetermined gap between the terminal ends of the retaining ring when said buckle member is mounted on the retaining ring flange portion and each tab is received through one such aperture and each aperture length is slightly greater than the circumferential extent of each said defined tab such that the retaining ring may expand in the radial direction to the limit of the aperture lengths; and

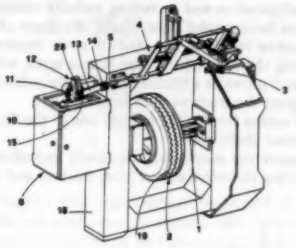
fastening means positioned through each tab bore to prevent removal of the buckle member.

4,683,931

MACHINE FOR AUTOMATICALLY ENGRAVING THE GROOVE IN TIRE TREADS

Claudio Matteuzzi, Via Pilastrino, 18, and Emilio Matteuzzi, Via Serra, 1, both of Calderara di Reno (Bologna), Italy (40012)

Filed Nov. 21, 1985, Ser. No. 800,543
Claims priority, application Italy, Nov. 23, 1984, 3631 A/84
Int. Cl.[4] B29D *30/68*
U.S. Cl. 157—13 **4 Claims**



1. A machine for automatically engraving a groove in a tire tread, which comprises:

a rotatable first shaft for supporting a tire, the first shaft being rotatably driven at a predetermined angular speed;

a reciprocatingly slidable, axially movable second shaft, the second shaft being disposed parallel to the first shaft;

a cutting tool for engraving a groove in a tire tread supported by the first shaft;

means for supporting the cutting tool, the tool supporting means being fixedly mounted on the second shaft and being movable therewith, the cutting tool being mounted on the tool supporting means; and

means for effecting a reciprocatingly motion to the second shaft in response to a rotational movement of the first shaft, the motion effecting means including an interchangeable gear cascade coupled to the first shaft, the gear cascade including an output shaft rotatable in response to the rotation of the first shaft, a cam mounted on the output shaft and rotatable therewith, the cam having a race formed in a surface thereof, a cam follower at least partially received by the race and reciprocatingly movable in a direction parallel to the axis of the output shaft in response to the rotational movement of the cam, a rack operatively coupled to the cam follower and reciprocatingly movable in response to the movement of the cam follower, a gear wheel engaging the rack and rotatable in response to the reciprocating movement of the rack, a rocker fixedly mounted on the gear wheel and extending radially therefrom, the rocker being angularly displaceable in response to the rotational movement of the gear wheel, a slider mounted on the rocker, and a connecting rod, the connecting rod having a first end coupled to the slider and a second end opposite the first end and coupled to the second shaft whereby angular movement of the rocker causes the second shaft to move axially.

4,683,932

ROLLING SHUTTER

Richard Bubendorff, Rue des Acacias, 68220 Hegenheim, France

Filed Nov. 19, 1984, Ser. No. 673,138
Claims priority, application France, Nov. 21, 1983, 83 18610; Jan. 1, 1984, 84 03347
Int. Cl.[4] E06B *9/14*
U.S. Cl. 160—133 **2 Claims**

1. A rolling shutter, which comprises:

a sectional shutter structure, the shutter structure having a plurality of blades arranged in a side-by-side relationship,

adjacent blades being hingedly interconnected, each blade including a stud projecting outwardly from at least one lateral edge thereof;

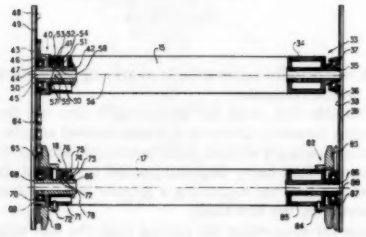
a rotatable first shaft coupled to the shutter, the shutter being adapted to be rolled about and unrolled from the first shaft;

a rotatable second shaft disposed parallel to the first shaft;

at least one cam wheel mounted on one end of the second shaft and rotatable therewith, the cam wheel being positioned relative to the shutter structure to engage the stud of each shutter blade, the cam wheel having a spider-like configuration and including radially extending arms, the arms having sides which have the shape of an involute of a curve to allow the stud of each shutter blade to slip along the sides of the cam wheel arms, wherein the cam wheel provides a backlash so that the wheel can positively engage the studs of the shutter blades;

drive means for driving at least one of the first shaft and the second shaft; and

disconnecting means for selectively and alternately disconnecting the drive means from the first and second shaft as



a function of the direction of travel of the shutter structure,

wherein the disconnecting means includes transmission means, the transmission means including a first freewheel end member mounted on the first shaft, and a second freewheel end member mounted on the second shaft, each freewheel end member including a lock bolt mounted thereon and positionable in a locking position and an unlocking position, and means for resiliently urging the lock bolt into a locking position,

wherein each freewheel end member includes an inner bore, and a sprocket received by the inner bore, the lock bolt of each member being adapted to extend into the inner bore and engage a notch formed in the sprocket, and

wherein each sprocket includes an operative face defining a portion of the notch formed therein, and a set-back face extending at a right angle to the operative face, wherein the lock bolt of each freewheel end member engages the operative face of the sprocket to cause the respective shaft to rotate in one direction, and engages the set-back face of the sprocket and is retracted thereby to allow the respective shaft to rotate freely in the opposite direction.

4,683,933

MOTOR DRIVEN SHADE LOWERING AND RAISING MECHANISM FOR ATRIUM WALLS

Donald D. Dunbar, Columbus, Ohio, assignor to Inside Outfitters, Inc., Columbus, Ohio

Filed Jul. 16, 1984, Ser. No. 631,424

Int. Cl.[4] E06B *9/204, 9/322*

U.S. Cl. 160—273 R **4 Claims**

1. A device for raising and lowering a plurality of shades on a wall having a vertical portion connected to a concave portion which in turn is connected to a portion approaching the horizontal, said wall being provided with a plurality of windows extending from the vertical portion through the concave portion and into the portions approaching the horizontal, said windows being separated by mullions extending throughout the length of said windows, at least a portion of each of said shades being positioned adjacent both said concave portion of said wall and said portion of said wall approaching the horizontal, said device comprising:

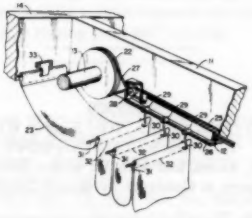
a plurality of compartmentalized parallel tracks attached to said wall on said contour of said wall, each mullion having a track on each side thereof so as to provide a pair of tracks for each window,

said compartmentalized track having a U-shaped cord guiding portion, the opening of which extends toward said windows and a U-shaped shade supporting portion, the opening of which faces the edge of said shade, and a common wall forming the base of said cord guiding portion and a side of said shade supporting portion,

a plurality of shade supports positioned in said shade supporting portion of each of said tracks,

a shade positioned between each pair of tracks and connected to said shade supports,

said cord guiding portion of each of said tracks being pro-



vided with means to prevent said cords from touching said shade and from sagging when said cords are in the concave position or in the position approaching the horizontal of said cord guiding portion of each of said tracks,

a drive pulley positioned at the upper end of each of said tracks,

a driven pulley positioned at the lower end of each of said tracks,

an endless cord engaging both of said pairs of driving and driven pulleys and positioned in the associated cord guiding portion of each of said tracks,

means for fixedly securing said cord to the lower portion of the shade to be raised or lowered by said device, wherein said means comprises a base portion permanently secured to a lower portion of the shade and an extension to which the cords are secured and which rides in the cord guiding portion of said track wherein said shade may be raised or lowered by movement of said cords, and

motor means for rotating said drive pulleys in either direction.

4,683,934

GATE LATCH

Arthur H. Salsness, 1032 S. Mulberry, Sioux City, Iowa 51106

Filed Mar. 14, 1986, Ser. No. 839,378

Int. Cl.[4] A47H *23/00;* **E06B** *3/80*

U.S. Cl. 160—328 **1 Claim**

1. In combination,

first and second vertically disposed and horizontally spaced-apart gate posts,

a plurality of substantially horizontally disposed and vertically spaced elongated wire members secured at one end to said first gate post and extending therefrom towards said second gate post,

a post member secured to the other ends of said wire members and adapted to be positioned adjacent said second gate post,

a first connection means secured to said second gate post

adjacent the lower end thereof, adapted to receive the lower end of said post member,

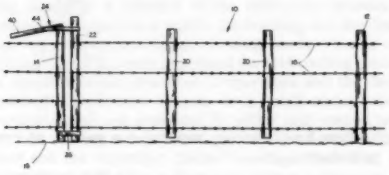
said first connection means comprising a substantially U-shaped rigid strap member having parallel legs, the end of each leg being secured to said second gate post and forming a U-shaped loop to receive said post member,

a second connection means secured to the top end of said second gate post for connection to the upper end of said post member, and

said second connection means comprising:

(a) an upstanding support having a pair of parallel and spaced-apart vertical ears affixed to a horizontal plate, said plate having a plurality of apertures through which nails are inserted to fasten said plate to the top of said second gate post, said plate having dimensions less than the diameter of said gate post, and fastened thereto with no portion of said plate extending beyond the diameter of said gate post,

(b) an elongated lever pivotally secured at one end to said ears, said pivotal securement including a pin journaled through an aperture in said lever and corresponding apertures in said ears, the pivotal axis being generally centered on top of said gate post,



(c) a U-shaped member comprising a pair of leg members joined by a base portion, said leg members being pivotally secured to said lever adjacent the pivotally connected end of said lever, each leg of said U-shaped member having an end portion parallel to said lever, the U-shaped member being pivotally secured to said lever at said end portions, each leg bent outwardly from each said end portion and then bent parallel to each other and said end portions and extending to join said base portion,

(d) wherein said U-shaped member is adapted to be positioned over and around the upper end of said post member so that said lever may be pivotally moved relative to said upstanding support, whereby said post member will be pulled towards said gate post and held in such position, and

(e) said U-shaped member being connected to said lever at a point such that pivotal movement of said lever is stopped by the contact of said U-shaped member with said plate, said contact occurring when the pivotal connection of said U-shaped member to said lever is located in a horizontal plane lower than the axis of the pivotal connection of the lever with the upstanding support member, whereby the lever is held in a locked position.

4,683,935

MOTOR-DRIVEN CURTAIN OPERATING UNIT

Ettore Arquati, Via Caduti del Lavoro, 31, 43044 - Collecchio (Parma), Italy

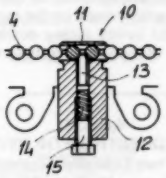
Filed Jan. 9, 1986, Ser. No. 817,442

Claims priority, application Italy, Feb. 20, 1985, 20847/85[U]

Int. Cl.[4] A47H *5/02*

U.S. Cl. 160—331 **1 Claim**

1. A motor-driven curtain-operating unit comprising an elongate supporting two-channel guide track for a closed loop ball chain extending at one end of the loop over a driving sprocket driven by a remotely controlled motor and at the other over return rollers, a carriage slidable along said track, said chain being connected to said carriage slidable along said guide track and connectable to an edge of a curtain, said carriage having a body defining an upper sleeve portion through which said chain passes, said sleeve portion being slidable in one of the channels of said guide track and the body of said carriage having a bore therein housing a rounded-head pin urged by a spring to project from said bore such that its end is located between two adjacent balls of said chain whereby, if



the motor is actuated with said carriage in an end of stroke position with the curtains open or closed, said balls of said chain cause resilient retraction of said pin into said bore of said body to achieve a relative slipping movement between said carriage and said chain, said motor-driven curtain-operating unit further comprising an adjustment screw housed in said bore of said body for calibrating the resilient thrust of said spring acting on said pin.

4,683,936

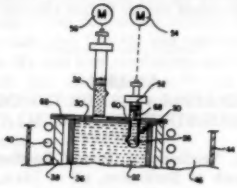
CONTROLLED SOLIDIFICATION, METHOD OF DISTRIBUTING STRENGTHENING ADDITIVES AND MAINTAINING A CONSTANT MELT LEVEL

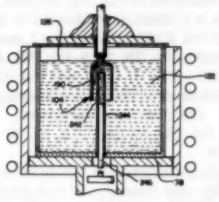
Michael Cybulsky, Mentor; Thomas S. Piwonka, Solon, and Virgil R. Brittain, Mentor, all of Ohio, assignors to TRW Inc., Cleveland, Ohio

Continuation of Ser. No. 610,890, May 16, 1984, abandoned. This application May 8, 1986, Ser. No. 862,168

Int. Cl.[4] B22D *27/00*

U.S. Cl. 164—122.1 **22 Claims**





1. A method of casting an article, said method comprising the steps of providing a mold having an open ended cavity with a configuration corresponding to the configuration of the article to be cast, providing a body of molten metal, lowering the mold into the body of molten metal with the open end of the mold cavity facing downwardly to fill the mold cavity with molten metal, withdrawing the mold form the body of

molten metal, maintaining the level of an upper surface of the body of molten metal substantially constant as the mold is withdrawn from the body of molten metal, said step of maintaining the level of the body of molten metal constant as the mold is withdrawn from the body of molten metal includes the step of lowering into the body of molten metal a makeup body having a cross sectional volume which varies from the lower end of the makeup body to the uper end portion of the makeup body in the same manner as in which the cross sectional volume of the mold varies from the upper end of the portion of the mold in the body of molten metal to the lower end of the mold, and solidifying the molten metal in the mold cavity with the open end of the mold cavity facing downwardly and while performing said step of withdrawing the mold from the body of molten metal.

4,683,937

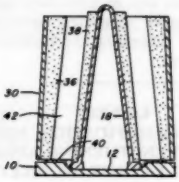
INGOT MOLD AND METHOD OF PRODUCING SAME

Paul E. Hamill, Jr., Penn Township, Westmoreland County, and Macy W. Vance, Monroeville, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 767,917, Mar. 4, 1977, abandoned. This application Sep. 3, 1981, Ser. No. 298,867

Int. Cl.⁴ B22C *3/00;* **B22D** *7/06*

U.S. Cl. 164—125 **11 Claims**



1. A method of manufacturing a cast iron ingot mold having a smooth, flat as-cast big-end surface comprising, casting the ingot mold in a sand mold having a smooth, flat rigidized fibrous insulative board incorporated into the sand mold such that the big-end surface of the resulting ingot mold is formed thereagainst at a cooling rate sufficient to yield a macrostructure and microstructure similar to that effected in an as-sand-cast surface.

4,683,938

METHOD AND APPARATUS FOR THE CONTINUOUS PRODUCTION OF STRIP USING OSCILLATING MOLD ASSEMBLY

Terry F. Bower, Needham; M. Ronald Randlett, and George Shinopulos, both of Burlington, all of Mass., assignors to Kennecott Corporation, Cleveland, Ohio

Division of Ser. No. 708,115, Mar. 5, 1985, Pat. No. 4,612,971, which is a continuation of Ser. No. 184,163, Sep. 4, 1980, abandoned, which is a continuation-in-part of Ser. No. 956,793, Nov. 1, 1978, Pat. No. 4,232,727, which is a continuation-in-part of Ser. No. 928,881, Jul. 28, 1978, Pat. No. 4,211,270. This application Feb. 3, 1986, Ser. No. 825,662

The portion of the term of this patent subsequent to Nov. 11, 1997, has been disclaimed.

Int. Cl.⁴ B22D *11/04, 11/70*

U.S. Cl. 164—413 **11 Claims**

1. An apparatus for integrated, continuous manufacture of hot rolled metallic strip from a melt comprising:

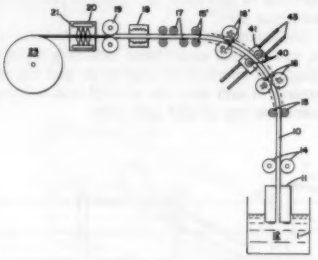
(1) casting means for continuous production of metallic rod from the melt, said casting means including a mold communicating with said melt, which mold oscillates in a direction parallel to the direction of travel of said rod,

(2) said casting means further comprising a driven withdrawal roll in conjunction wiht a pinch roll to draw said rod through said mold at a constant rate,

(3) means cooperating with said causing means for regulating the speed of the metallic rod to maintain a substantially constant forward speed before the rod is converted to strip, said means for regulating the speed of the metallic rod comprising:

(a) means for changing the direction of travel of said rod after emergence from said drawing means,

(b) means permitting slack through lateral deflection of said rod, said means permitting said slack comprising one or more pairs of slack accommodating rolls arranged near the mid-point of said arcuate path which are adapted to restrain said rod in a direction parallel to the axis of said slack accommodating rolls while allowing deflection of said rod in a direction perpendicular to the axis of said slack accommodating rolls, and



(c) means for advancing said rod in a manner to control said slack, and

(4) processing means cooperating with said casting means and said regulating means for continuous conversion of said rod to said hot rolled strip, said processing means comprising a rolling mill adapted for flattening said rod for conversion to strip.

(5) said casting means, means for regulating and processing means being arranged to act on a metallic rod which is continuous from said casting means through said processing means to continuously form an integrated metallic strip.

4,683,939

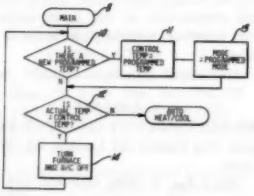
ELECTRONIC THERMOSTAT WITH SELECTABLE MODE TO CONTROL HEATING ONLY, COOLING ONLY OR BOTH HEATING AND COOLING

Michael R. Levine, Ann Arbor, Mich., assignor to Honeywell, Inc., Minneapolis, Minn.

Division of Ser. No. 602,221, Apr. 19, 1984, Pat. No. 4,635,708. This application Sep. 19, 1986, Ser. No. 909,774

Int. Cl.⁴ F25B *29/00*

U.S. Cl. 165—12 **14 Claims**



1. A thermostat for use in a building having means for cooling the building and means for heating the building, the thermostat being connected to said cooling means and said heating means and operative to generate an energizing signal for only one of said heating means or cooling means at a given time, the thermostat comprising:

means for measuring the ambient temperature within the building;

manual data entry means;

means for storing a program of desired heating temperatures over a repetitive time cycle, programmed by said manual data entry means;

a clock operative to generate time signals within said repetitive time cycle;

means for generating a signal representative of a desired heating temperature and a desired cooling temperature at the present time based upon the signals from the clock in the stored temperature program, said desired heating temperature equal to said desired heating temperature programmed for the present time, said desired cooling temperature equal to a first predetermined temperature if said desired heating temperature programmed for the present time is in a first range of temperatures, and said desired cooling temperature equal to a second predetermined temperature, higher than said first predetermined temperature, if said desired heating temperature programmed for the current time is in a second range of temperatures, lower than said first range of temperatures; and

means for placing the thermostat in either a first mode wherein control signals are generated only for said heating means as a function of the difference between the measured temperature within the building and the desired heating temperature signal, a second mode wherein energizing signals are only generated for said cooling means as a function of the measured temperature and the desired cooling temperature signals, or a third mode wherein control signals are generated for either said heating means or said cooling means based upon the measured temperature and the respective desired heating and cooling temperature signals.

4,683,940

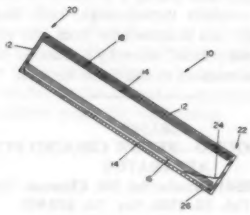
UNIDIRECTIONAL HEAT PIPE

Donald M. Ernst, Leola, and Jerome E. Toth, Hatboro, both of Pa., assignors to Thermacore, Inc., Lancaster, Pa.

Filed Jul. 16, 1986, Ser. No. 886,218

Int. Cl.[4] F28F *27/00*; F23D *15/00*

U.S. Cl. 165—32 **2 Claims**



1. A heat pipe with normal heat transfer in a forward direction and limited heat transfer in the reverse direction comprising:

a sealed evacuated casing with a normal evaporator and a normal condenser used for heat transfer in the forward direction;

at least one liquid pumping capillary artery structure with a sealed end located at the normal evaporator of the heat pipe casing and an open end located at the normal condenser of the heat pipe casing;

a liquid retaining means located at the normal condenser of the heat pipe, the liquid retaining means oriented so that liquid retained within it closes off the open end of the artery structure; and

heat transfer liquid located within the casing in at least sufficient quantity so that, during heat transfer in the forward direction, sufficient liquid accumulates in the liquid retaining means to close off the open end of the artery structure.

4,683,941

SYSTEM FOR CONTROLLING THE TEMPERATURE OF ROOMS

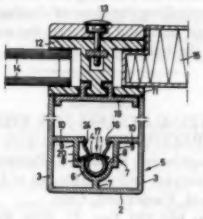
Hans H. Timmer, Erkrath, and Wolfgang Reichel, Iserlohn, both of Fed. Rep. of Germany, assignors to Ingenieurburo Timmer GmbH, Fed. Rep. of Germany

Filed Feb. 25, 1986, Ser. No. 832,632

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1985, 3507951

Int. Cl.[4] F24H *3/00*

U.S. Cl. 165—47 **27 Claims**



1. System for controlling temperature of rooms of a building by means of frame elements consisting of metal uprights and cross-beams, for example for building openings such as windows and doors, in which a fluid is conducted in a pipe line running through a hollow interior space of the uprights and cross-beams, and the temperature of surfaces facing an interior of the building of the frame elements is controlled by indirect heat transfer, characterized in that the indirect heat transfer between the pipe line (1) and a heat transfer profile (5) formed by the frame elements occurs through placement of said pipe line (1) on heat conducting contact surfaces (6) for support thereof, said heat conducting contact surfaces (6) being connected over crosspieces (7) to said heat transfer profile (5) to provide a one piece construction thereof for heat conduction therebetween, and a heat conducting contact element (4) disposed between said pipe line (1) and said heat conducting contact surfaces (6), said heat conducting contact element (4) being in contact with said pipe line (1) and in removable contact with said heat conducting contact surfaces (6) so that said pipe line (1) can be removed from said heat conducting contact surfaces (6).

4,683,942

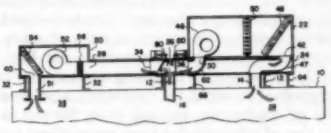
ASSEMBLY FOR RETROFITTING TWO AIR HANDLING UNITS TO AN INSTALLATION ORIGINALLY MEANT FOR A SINGLE UNIT

James A. Bierkamp, La Crosse; Scott D. Hall, Onalaska, and Wade W. Smith, La Crosse, all of Wis., assignors to American Standard Inc., New York, N.Y.

Filed Sep. 29, 1986, Ser. No. 912,282

Int. Cl.[4] F24D *9/00*

U.S. Cl. 165—53 **30 Claims**



1. An assembly for retrofitting two replacement air handling

units to a building's existing roof curb, existing supply air ducts, and existing return air duct which were associated with a previous air handling unit serving multiple zones, said assembly comprising:

a. an adaptor frame of generally rectangular shape, including means for supporting one of the replacement air handling units atop the existing roof curb and further including a return air passage for conveying return air from the existing return air duct to a return air inlet in said one of the replacement air handling units;

b. means for supporting the other replacement air handling unit adjacent the adaptor frame and including means for conveying return air from the building into a return air inlet of the other replacement air handling unit; and

c. manifold means for connecting a discharge outlet of each of the two replacement air handling units to the existing supply air ducts in the building and including a plurality of valves for controlling the flow of discharge air from each replacement air handling unit into the supply air duct for each zone in the building.

4,683,943

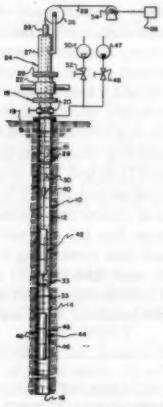
WELL TREATING SYSTEM FOR STIMULATING RECOVERY OF FLUIDS

Gilman A. Hill, Englewood; Richard S. Passamaneck, Littleton, and Kenell J. Touryan, Indian Hills, all of Colo., assignors to Mt. Moriah Trust, Englewood, Colo.

Division of Ser. No. 686,990, Dec. 27, 1984, Pat. No. 4,633,951. This application Jul. 24, 1986, Ser. No. 890,077

Int. Cl.[4] E21B *29/02, 43/11*

U.S. Cl. 166—63 **3 Claims**



1. In a system for fracturing a subterranean earth formation to stimulate the production of fluids from said formation into a wellbore extending to said formation, perforating and gas generating means for forming apertures for the flow of fluid between said wellbore and said formation and for generating combustion gases to initiate fractures in said formation comprising:

elongated generally cylindrical canister means adapted to be disposed in said wellbore; said canister means including a first section including a plurality of explosive perforating charges for forming said apertures and a plurality of second sections connected end to end to said first section with each second section including a quantity of combustible propellant material for producing a predetermined quantity of combustion gas and being formed in a first annular ring of relatively fast burn material and a cylindrical core portion within said ring comprising slower burning material, said second sections being disposed in a generally cylindrical outer canister member formed of a material which will disintegrate to a state which will preclude plugging said apertures upon ignition and burning of said propellant material, fuse means for igniting said fast burn material, coupling means for connecting said plurality of second sections and said first section to each other prior to insertion of said perforating and gas generating means into said wellbore, and means for suspending said perforating and gas generating means in said wellbore.

4,683,944

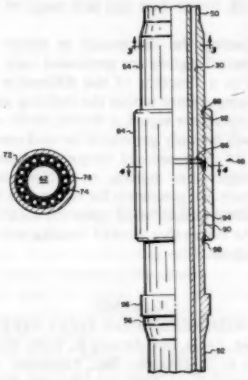
DRILL PIPES AND CASINGS UTILIZING MULTI-CONDUIT TUBULARS

Harry B. Curlett, Farmers Branch, Tex., assignor to Innotech Energy Corporation, Carrollton, Tex.

Filed May 6, 1985, Ser. No. 730,831

Int. Cl.[4] E21B *17/18*

U.S. Cl. 166—65.1 **28 Claims**



1. A tubular for use in well drilling and production, comprising an elongate pipe with ends adapted to be connected with ends of other similar drill pipes, a plurality of independent arcuately spaced conduits therethrough, each said conduit extending uniformly and substantially from one end of said pipe to the other end thereof, whereby a plurality of different fluids can be communicated to and from the well.

4,683,945

ABOVE GROUND—BELOW GROUND PUMP APPARATUS

Istvan K. Rozsa, 20541 Broadacres, Mt. Clemens, Mich. 48043

Filed Feb. 18, 1986, Ser. No. 829,983

Int. Cl.[4] E21B *43/12*

U.S. Cl. 166—68.5 **11 Claims**

1. A pump apparatus for above ground and below ground pumping installations within a well casing comprising:

first pump means mounted above ground for alternately pumping fluid into and out of the well casing;

discharge means connected to the first pump means for discharging fluid from the first pump means;

second pump means mountable within the well casing for pumping underground fluid from the well casing to the ground surface;

first and second conduit means disposed in fluid flow communication between the first and second pump means;

first, second, third and fourth fluid cylinders;

a third conduit having opposed ends;

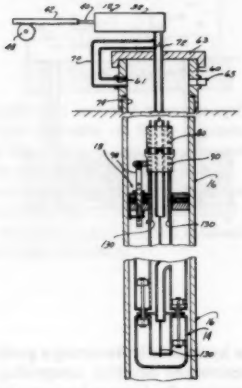
the first and second fluid cylinders being formed in the end of the first conduit means and one end of the third conduit and the third and fourth fluid cylinders being formed in

the end of the second conduit means and the opposite end of the third conduit;

first and second divider means separating the first and second cylinders, and the third and fourth cylinders, respectively;

first and second pistons interconnected by a connecting rod and reciprocally movable in the first and second fluid cylinders, the first and second pistons in conjunction with the first and second fluid cylinders and the first divider means forming first and second fluid chambers;

third and fourth pistons interconnected by a connecting rod and reciprocally movable in the third and fourth fluid cylinders, the third and fourth pistons in conjunction with



the third divider means forming third and fourth fluid chambers;

an inlet and an outlet formed on each fluid cylinder for the ingress and egress of fluid;

check valve means mounted within each inlet and outlet for allowing fluid to flow from the well casing into the inlet only and fluid to flow from the fluid cylinder outward through the outlet only;

means connected to selected ones of the outlets of the fluid cylinders for providing a fluid flow path from the fluid cylinders to the first and second conduit means; and

means for anchoring the second pump means at a predetermined position within the well casing.

4,683,946

METHOD AND APPARATUS FOR THE INSTALLATION AND MODIFICATION OF OIL WELL EVACUATION SYSTEMS

Brian D. Jones, Bakersfield, Calif., assignor to Strategic Energy Services, Inc., Bakersfield, Calif.

Continuation-in-part of Ser. No. 576,970, Feb. 3, 1984, Pat. No. 4,552,220. This application Nov. 12, 1985, Ser. No. 797,368

Int. Cl.[4] E21B *37/02*

U.S. Cl. 166—170 **7 Claims**

1. An article for use in an oil well evacuation system having a belt circulating between a station at the head of said well and the bottom of said well, said article comprising:

a unit at the bottom of said well providing turn around means for said belt; and

means on said unit for excavating dirt and sand found at the bottom of said well, said excavating means being powered by the movement of said belt around said unit.

4,683,947

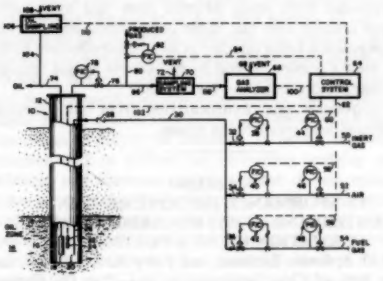
PROCESS AND APPARATUS FOR MONITORING AND CONTROLLING THE FLAMMABILITY OF GAS FROM AN IN-SITU COMBUSTION OIL RECOVERY PROJECT

John M. Fernbacher, Allentown, and James G. Hansel, Emmaus, both of Pa., assignors to Air Products and Chemicals Inc., Allentown, Pa.

Filed Sep. 5, 1985, Ser. No. 772,968

Int. Cl.[4] E21B *43/24, 43/243*

U.S. Cl. 166—251 **4 Claims**



1. In a process for producing oil and gas from a production well in an oil-bearing formation using in-situ combustion of a portion of the oil with an oxidant gas, the improvement for controlling the flammability of the gas co-produced with the oil, comprising:

(a) sampling the produced oil from said production well and determining its distillation characteristics;

(b) periodically sampling the produced gas from said production well;

(c) sensing the temperature and pressure of the production well and sensing the flow rate of the produced gas;

(d) processing the sampled production gas through a gas analyzer to determine its gas composition;

(e) comparing the output of step (d) adjusted for the conditions of step (a) and (c) against pre-existing gas composition specifications for flammability wherein the comparison includes the determination of the flammability value $\lambda=(0_2)/(0_2)_s$ in which (0_2) is the measured oxygen content of the produced gas in moles and $(0_2)_s$ is the oxygen content in moles which are required to stoichiometrically combust the fuel components in the mixture and the determination of the amount of inert gas (nitrogen equivalent) in the mixture and injecting a moderant gas into the production well adjacent the oil bearing formation when the composition of step (d) exceeds the pre-existing gas com-

position specifications for flammability, said injection continuing until the sampled production gas is outside the range of gas composition specifications for flammability.

4,683,948

ENHANCED OIL RECOVERY PROCESS EMPLOYING CARBON DIOXIDE

Graham C. Fleming, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed May 23, 1986, Ser. No. 866,542
Int. Cl.[4] E21B *43/22*
U.S. Cl. 166—263 **20 Claims**

1. A process for recovering hydrocarbons from a hydrocarbon-bearing porous formation through at least one production means in fluid communication with said formation comprising:

(a) injecting carbon dioxide into said formation;

(b) shutting in said formation for a period of time sufficient to allow at least a portion of said injected carbon dioxide to contact and become dispersed in said hydrocarbons in said formation;

(c) recovering hydrocarbons from said formation without reducing the average pressure in said formation substantially relative to the average pressure in said formation prior to conducting step (a);

(d) repeating steps (a), (b) and (c) at least once;

(e) injecting an aqueous liquid compositions into said formation through at least one injection means in fluid communication with said formation, said liquid composition being saturated with carbon dioxide to the extent that the carbon dioxide dispersed in said hydrocarbons and in the reservoir pore space created by step (c) is substantially precluded from being stripped from said hydrocarbons upon contact with said liquid composition and said liquid composition being injected in an amount effective to drive at least a portion of said hydrocarbons in said formation toward said production means; and

(f) recovering said hydrocarbons from said formation through said productions means.

4,683,949

CONFORMANCE IMPROVEMENT IN A SUBTERRANEAN HYDROCARBON-BEARING FORMATION USING A POLYMER GEL

Robert D. Sydansk, Littleton, and Perry A. Argabright, Larkspur, both of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Continuation-in-part of Ser. No. 807,416, Dec. 10, 1985, abandoned. This application Jan. 27, 1986, Ser. No. 822,709
Int. Cl.[4] E21B *33/138*
U.S. Cl. 166—270 **62 Claims**

9. A process for substantially plugging at least one relatively high permeability region bounded by at least one relatively low permeability region in a hydrocarbon-bearing formation below an earthen surface, said formation penetrated by a wellbore in fluid communication withh said at least one relatively high permeability region, the process consisting essentially of the steps of:

(a) preparing a gelation solution at the surface consisting essentially of a water-soluble acrylamide polymer, a complex capable of crosslinking said polymer and formed of at least one electropositive chromium III species and at least one electronegative carboxylate species, and a solvent for said polymer and said complex;

(b) injecting said gelation solution into said wellbore;

(c) displacing said gelation solution into said at least one relatively high permeability region; and

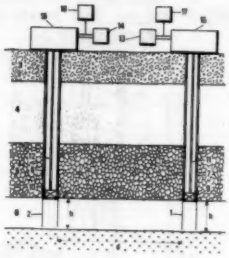
(d) crosslinking said gelation solution substantially to completion in said at least one relatively high permeability region to form a crosslinked gel which substantially plugs said at least one relatively high permeability region.

4,683,950

PROCESS FOR HYDRAULICALLY FRACTURING A GEOLOGICAL FORMATION ALONG A PREDETERMINED DIRECTION

Jacques Lessi, Maisons Laffitte, France, assignor to Institut Francais du Petrole, Rueil-Malmaison, France

Filed May 22, 1981, Ser. No. 266,039
Claims priority, application France, May 23, 1980, 80 11648
Int. Cl.[4] E21B *43/26*
U.S. Cl. 166—271 **13 Claims**



1. A process for hydraulically fracturing a geological formation along a predetermined direction, comprising:

injecting a pressurized fluid into at least two injection wells penetrating the formation, with said two wells positioned along said predetermined direction, and with said injecting step comprising effecting a preliminary injection of a predetermined quantity of hydraulic fluid in both wells simultaneously at the level of the geological formation, during a time interval at least equal to a preselected minimum value, with the pressure of the hydraulic fluid at the level of the formation at the end of this preliminary injection period remaining lower than the pressure of fracturation of the geological formation, and said preliminary injection being conducted to directly cause by diffusion of the fluid a sufficient change in the field or tensor of stresses within the geological formation at a distance remote from each of said wells, to define said predetermined direction of fracture; and following the preliminary injection with an injection of hydraulic fluid through at least one of said wells at a pressure at least equal to the pressure of fracturation of the geological formation to cause fracturing thereof along said predetermined direction.

4,683,951

CHEMICAL FLOODING AND CONTROLLED PRESSURE PULSE FRACTURING PROCESS FOR ENHANCED HYDROCARBON RECOVERY FROM SUBTERRANEAN FORMATIONS

Prabodh Pathak, Plano, and Stephen J. Salter, Dallas, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed May 15, 1986, Ser. No. 863,663
Int. Cl.[4] E21B *43/22, 43/263*
U.S. Cl. 166—271 **9 Claims**

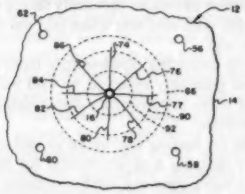
1. A method for producing hydrocarbon fluids from a subterranean formation into which at least one injection well and at least one production well have been drilled, respectively, said method comprising the steps of:

injecting fluid into said formation through said injection well

to form a flood front extending toward said at least one production well;

terminating injection of said fluid;

placing gas generating means in said injection well and generating a relatively high pressure pulse of gas in said injection well to create multiple fractures in said formation extending substantially radially from said injection well but not beyond said flood front;



injecting a surfactant into said injection well after creating said multiple fractures to form a generally uniformly expanding flood front in said formation extending toward said at least one production well; and

injecting a drive fluid into said injection well to drive the slug of surfactant and hydrocarbon fluids toward said at least one production well for the production of said hydrocarbon fluids therefrom.

4,683,952

FLUID LOSS CONTROL IN OIL FIELD CEMENTS

Dennis G. Peiffer, East Brunswick; Robert D. Lundberg, Bridgewater, both of N.J.; Lawrence Sedillo, Houston, and John C. Newlove, Kingwood, both of Tex., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Division of Ser. No. 651,897, Sep. 19, 1984, Pat. No. 4,626,285. This application Sep. 4, 1986, Ser. No. 903,450

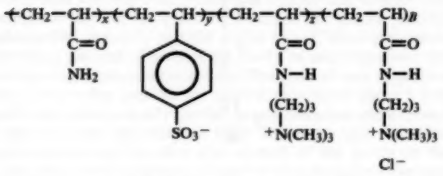
Int. Cl.[4] C04B *7/35;* **E21B** *33/14*

U.S. Cl. 166—293 **4 Claims**

1. A process for cementing pipe or casing on a gas or oil well which penetrates a formation which comprises depositing in the space between said pipe or said casing and said formation an aqueous slurry comprising:

(a) about 35 to about 90 weight percent of water based on weight percent of dry cement; and

(b) about 0.1 to about 2 weight percent of a terpolymer, based on weight percent of dry cement said terpolymer having the formula:



wherein x is about 40 to about 98 mole %, y is about 1 to about 50 mole %, z is about 1 to about 50 mole %, y is equal to z, a is about 1 to about 50 mole %, wherein B, y and z are less than 60 mole %.

4,683,953

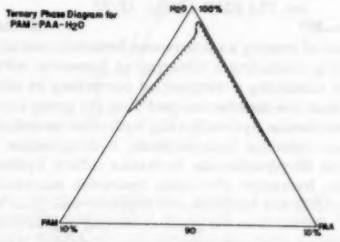
SHEAR THICKENING COMPOSITIONS CONTAINING POLYACRYLIC ACID AND POLYACRYLAMIDE, THEIR PREPARATION AND USE

Daniel J. Eustace, Acushnet, Mass.; Donald B. Siano; Evelyn N. Drake, both of Lebanon, N.J., and Peter Calcavecchio, Somerville, N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 586,840, Mar. 6, 1984, which is a continuation-in-part of Ser. No. 516,767, Jul. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 413,460, Aug. 31, 1982, abandoned. This application Mar. 14, 1985, Ser. No. 711,996

Int. Cl.[4] C09K *7/02, 7/06;* **E21B** *33/13, 33/138*

U.S. Cl. 166—294 **11 Claims**



1. A process for plugging a portion of a well bore using a shear-thickening composition and a emulsion spacer wherein a conduit, which contains a fluid, extends down into a well bore from the surface thereof to at least that portion of said well bore desired to be plugged and wherein said shear-thickening composition comprises a water-in-oil emulsion having particles of hydratable, water-expandable clay dispersed in the continuous oily phase thereof, said oily phase comprising a hydrocarbon liquid having a surfactant dissolved therein which surfactant comprises a polyamine attached to an oil solubilizing hydrocarbon with or without an intervening bridging group and wherein said dispersed aqueous phase of said emulsion comprises an aqueous polymer solution, having a pH below 7, of both a polyacrylic acid and polyacrylamide, and wherein said spacer comprises a water-in-oil emulsion having a composition similar to the water-in-oil emulsion of said shear-thickening composition and wherein each droplet of dispersed aqueous phase of said shear-thickening composition is encapsulated in a film which forms as a result of the interaction of said polyacrylic acid, surfactant and polyacrylamide, said process comprising the steps of:

(a) forming a solution of said aqueous phase by mixing together a solution of polyacrylic acid containing no more than 2 wt% of said acid and an aqueous solution of polyacrylamide containing no more than about 2 wt% of said polyacrylamide polymer;

(b) dispersing said aqueous phase into said surfactant-containing oily phase to form said water-in-oil emulsion;

(c) dispersing particles of said hydratable, water expandable clay into said continuous oily phase of said emulsion;

(d) positioning the bottom of said conduit to the location of said well bore desired to be plugged;

(e) pumping a first position of said spacer emulsion into said fluid containing conduit;

(f) pumping said shear-thickening composition into said conduit so that said shear-thickening composition contacts said spacer emulsion in said conduit;

(g) pumping a second portion of said spacer emulsion into said conduit so that it contracts said shear-thickening composition;

(h) pumping a displacing fluid into said conduit so that it contacts said second portion of said spacer emulsion and

displaces said shear-thickening composition at a relatively low shear rate to the bottom of said conduit, and

(i) increasing the pumping rate of said displacing fluid into said conduit to force said shear-thickening composition out of the bottom of said conduit under conditions of shear of at least about 2,000 sec.$^{-1}$ to form a paste and plug said well bore.

4,683,954

COMPOSITION AND METHOD OF STIMULATING SUBTERRANEAN FORMATIONS

Michael L. Walker; William G. F. Ford; Walter R. Dill, and Ricky D. Gdanski, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Sep. 5, 1986, Ser. No. 904,736
Int. Cl.^{4} E21B *43/267, 43/27*
U.S. Cl. 166—307 **20 Claims**

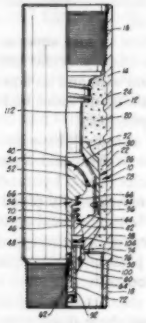
1. A method of treating a subterranean formation containing iron comprising contacting a subterranean formation with an aqueous fluid containing a composition comprising an admixture of (i) at least one member selected from the group consisting of hydroxylamine hydrochloride, hydrazine monohydrochloride, hydroxylamine hydrobromide, hydroxylamine sulfate, hydrazine dihydrochloride, hydrazine sulfate, hydrazine monobromide, hydrazine dibromide, hydrazine monoiodide, hydrazine diiodide and hydroquinone together with (ii) at least one member selected from the group consisting of gluconodeltalactone, isomers of gluconodeltalactone, citric acid, salts of citric acid, ethylenediaminetetraacetic acid, salts of ethylenediaminetetraacetic acid, nitrilotriacetic acid, salts of nitrilotriacetic acid, hydroxyethylethylenediaminetriacetic acid, and salts of hydroxyethylethylenediaminetriacetic acid and (iii) a catalytic amount of a solubilized salt of a compound capable of providing at least one member selected from the group consisting of cupric, cuprous, nickel or zinc ions, said composition being present in an amount sufficient to substantially prevent the precipitation of ferric iron in said aqueous fluid during said contacting with said subterranean formation.

4,683,955

AUTOMATIC FILL-UP FLOATING APPARATUS

Lee W. Stepp, Comanche; Morris G. Baldridge, and Harold O. Treece, both of Duncan, all of Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Apr. 30, 1986, Ser. No. 858,141
Int. Cl.^{4} E21B *34/00*
U.S. Cl. 166—327 **13 Claims**



8. A floating apparatus for use in a well, said apparatus comprising:

a casing portion;

a housing disposed in said casing portion and having a central opening therethrough, said housing comprising:

an upper portion having a downwardly facing seat thereon;

a valve guide disposed in said central opening; and

a lower portion defining a body receiving bore therethrough in communication with said central opening and terminating at a lower end proximate the bottom of said central opening;

means for fixedly locating said housing in said casing portion; a valve disposed in said housing and comprising:

a valve element having an upwardly facing sealing surface engageable with said seat when said valve is in a closed position; and

a valve stem extending downwardly from said valve element and guidingly received by said valve guide such that said valve is donwardly displaceable to a variably open position;

biasing means for biasing said valve to said closed position;

a filling body defining a cavity therein for receiving a portion of said valve stem and further defining a substantially longitudinal flow passage therethrough in communication with said housing central opening, said filling body having a holding position whereat said filling body extends upwardly at least partially into said body receiving bore in said housing, said filling body including upwardly facing shoulder means on the perimeter thereof abutting said lower end of said lower portion;

shear means for shearably attaching said valve stem to said filling body such that said valve is held in an open positon when said filling body is in said holding position; and

flow passage closing means having a closed position for closing said flow passage through said filling body in response to downward fluid flow through said casing portion and an open position spaced from said filling body for allowing upward fluid flow through said casing portion when said valve is held in said open position by said shearing means.

4,683,956

METHOD AND APPARATUS FOR OPERATING MULTIPLE TOOLS IN A WELL

Larry R. Russell, 6025 Edgemoor-Ste. C, Houston, Tex. 77081

Filed Oct. 15, 1984, Ser. No. 661,148
Int. Cl.^{4} E21B *23/08, 43/00*
U.S. Cl. 166—383 **8 Claims**

1. A bottom-hole assembly for use in a bore hole, comprising:

a drill string including a plurality of segments;

a plurality of spaced-apart well tools interconnected in serial order between segments of said drill string, including a

lowermost well tool, in fluid communication with said drill string;

means for providing fluid pressure to said drill string and said well tools, including means for cyclically increasing and decreasing the fluid pressure to produce programmed sequences of cyclic pressure increments and decrements; and

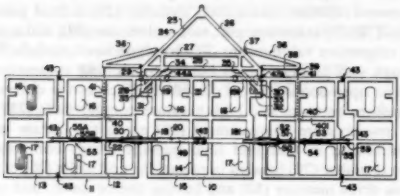
a barrel cam mounted within, and associated with, each said well tool, the barrel cam being slidably disposed for motion within each said well tool in response to said cyclic pressure increments and decrements for the purpose of actuating said well tool, each said barrel cam including a cam groove characterized by a unique cam-groove pattern and a fixed cam follower for engaging said cam groove, each individual barrel cam, by reason of its unique cam-groove pattern, being responsive in its motions to a programmed sequence of said cyclic pressure increments and decrements for selectively actuating its associated well tool simultaneously with others of the plurality of well tools in selected operative combinations of said plurality of well tools.

4,683,957

AGRICULTURAL IMPLEMENT INCLUDING A CENTRAL SECTION AND TWO WING SECTIONS

Laurent L. Bussiere, P.O. Box 118, Vonda, Saskatchewan, Canada S0K 4N0

Filed Mar. 10, 1986, Ser. No. 837,734
Int. Cl.[4] A01B *73/04*
U.S. Cl. 172—311 **13 Claims**



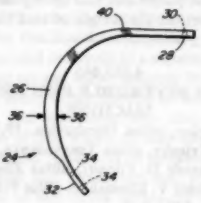
1. A pull-type agricultural implement comprising a central frame section and two outer wing sections, the sections arranged in-line transverse to the direction of working motion of the implement with an inner end of each each of the wing sections lying closely adjacent a respective one of outer ends of said central section, each of said sections comprising a frame for supporting ground-working tools and ground wheels for carrying the frame across the ground, and two pivotal coupling means each for interconnecting an inner end of a respective one of the wing sections to the respective outer end of the central section so as to allow pivotal movement of said respective one of said wing sections relative to said central section about an axis generally parallel to the direction of working motion, each said pivotal coupling means being arranged to define said axis and comprising first and second separate and independently movable levers arranged in spaced parallel relationship generally at right angles to said direction, means mounting one end of each of the levers on said respective one of the wing sections adjacent the inner end of said respective one of the wing sections for pivotal movement about a first horizontal axis generally parallel to said direction and a second horizontal axis generally at right angles to said direction, means mounting the other end of each of the levers on the central section at a position inboard of the respective outer end of the central section for pivotal movement about a further horizontal axis parallel to said direction whereby said one end of each of the levers is free to lift in a vertical direction to allow the inner end of the respective one of the wing sections to lift and means on the central section restricting the downward movement of each of the levers to limit the downward movement of the inner end of the respective one of the wing sections.

4,683,958

CULTIVATOR SHANK

Leon Malinowski, and Kenneth Lange, both of Yorkton, Canada, assignors to Leon's Mfg. Co. Ltd., Saskatchewan, Canada

Filed Jun. 17, 1985, Ser. No. 746,161
Claims priority, application Canada, Mar. 8, 1985, 476063
Int. Cl.[4] A01B *23/02*
U.S. Cl. 172—705 **2 Claims**



1. A spring steel cultivator shank of generally rectangular cross-section throughout its length comprising a one-piece generally open C-shaped central body portion having one end for connection to a cultivator frame mount and anther end for connection to a ground engaging tool;

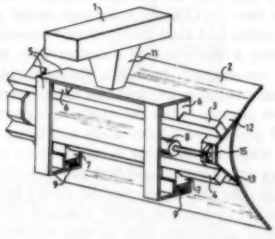
said shank, intermediate said ends, changing in two cross-sectional dimensions from the cultivator mount end, which has a major cross-sectional dimension that is horizontal and at a right angle to the direction of travel, toward the tool mount end, which has a major cross-sectional dimension that is in the direction of travel, to provide a profile of changing cross-sectional area so that the central body portion is deeper in cross-section in line with the direction of travel of the shank than the width of the central body portion transverse to the direction of travel of the shank.

4,683,959

BLADE GUIDE SYSTEM FOR GRADING VEHICLE WITH DISPLACEABLE GRADING BLADE

Karl-Heinz Clemens, Dortmund, Fed. Rep. of Germany, assignor to O&K Orenstein & Koppel Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Filed Aug. 20, 1985, Ser. No. 767,533
Claims priority, application Fed. Rep. of Germany, Sep. 28, 1984, 3435703
Int. Cl.[4] E02F *3/76*
U.S. Cl. 172—795 **2 Claims**



1. In a grading vehicle having a grading blade, the grading blade being operatively displaceably guided transversely to the longitudinal direction of the vehicle on a frame of the vehicle in a blade guidance frame, the improvement comprising

two substantially horizontally extending guide ledges which

are spaced vertically from each other and are mounted on the blade,

upper and lower slide pieces confining said ledges against longitudinal movement, said ledges being displaceable between said upper and lower slide pieces transversely to the longitudinal direction of the vehicle, said upper slide pieces being rigidly disposed on said blade guidance frame, and

spring means disposed between said blade guidance frame and said lower slide pieces for pressing said lower slide pieces upwardly against the lower of said guide ledges and pressing the upper of said guide ledges upwardly against said upper slide pieces and said spring means constituting the sole support for the weight of said blade.

4,683,960

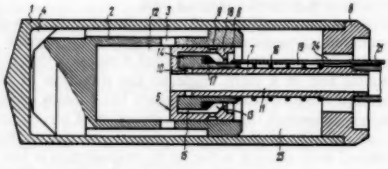
AIR-OPERATED REVERSIBLE PERCUSSIVE ACTION MACHINE

Alexandr D. Kostylev, ulitsa Derzhavina, 19, kv. 70, Novosibirsk; Vasily I. Ivinsky, ulitsa Tsnyanskaya, 2, korpus 3, kv. 19, Minsk; Alexandr D. Filonov, ulitsa Zhudro, 81, kv. 21, Minsk, and Vladimir V. Klimashko, ulitsa Frunze, 67, kv. 124, Novosibirsk, all of U.S.S.R.

Filed Oct. 11, 1984, Ser. No. 659,779

Int. Cl.[4] B25D *9/00*

U.S. Cl. 173—91 **2 Claims**



1. An air-operated reversible percussive action machine comprising:

a housing;

a hammer accommodated inside said housing and capable of axial reciprocations, said hammer striking blows on a front inner end of said housing when operating in a forward percussive action operational mode and striking blows on a tail inner end of said housing when operating in a rearward percussive action operational mode, and said hammer having an axial cavity open on a first end facing said tail inner end of said housing and a through radial passage facing said tail inner end, said hammer defining with said housing a front working chamber near said front inner end of said housing;

a cylindrical tube coaxially accommodated in said housing near said hammer and having a stepped configuration wherein a first step has a larger diameter than a second step, said first step having a through radial passage and located within said axial cavity of said hammer in a manner forming a rear working chamber with said hammer and said second step having a through radial opening within said annular cavity and said radial opening being in an opened position when the machine is operated in said rearward percussive action mode and being in a closed position when the machine is operated in said forward percussive action mode, said first and second steps of said cylindrical tube forming an annular cavity between them;

a spring-loaded cylindrical sleeve mounted on said second step of said cylindrical tube in said annular cavity and being movable for axial reciprocations;

a means for pressure-sealing said annular cavity;

a means for controlling displacements of spring-loaded cylindrical sleeve; and a flange mounted on said second step of said cylindrical tube and connecting said cylindrical tube to said tail end in said housing.

4,683,961

HYDRAULIC TORQUE IMPULSE MOTOR

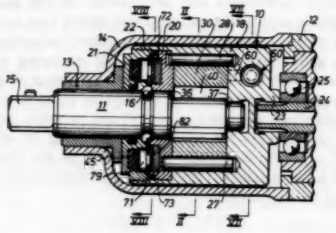
Knut C. Schoeps, Klotvägen, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Dec. 12, 1985, Ser. No. 808,332

Claims priority, application Sweden, Dec. 21, 1984, 8406560; Nov. 6, 1985, 8505223

Int. Cl.[4] B25D *15/02*

U.S. Cl. 173—93 **6 Claims**



1. Hydraulic torque impulse tool, comprising a housing (12), an inertia drive member (10) coupled to a rotation motor in said housing and including a fluid chamber (19), an output spindle (11) having an impulse receiving rear portion extending into said fluid chamber (19), an impulse generating seal means (30) movably arranged in said fluid chamber (19) and dividing the latter into a high pressure compartment (38) and a low pressure compartment (39) during a limited portion of its movement relative to said fluid chamber (19), a fluid passage means (70; 79) extending past said seal means (30), and a pressure responsive valve means (82) arranged to control the flow through said passage means (70;79) by shifting automatically from an open condition to a closed condition as the difference in pressure between said high pressure compartment (38) and said low pressure compartment (39) exceeds a certain level, characterized in that said fluid passage means comprises a valve chamber (70) located in one of the end walls (20) of said inertia drive member (10) and having one or more fluid communication openings (80, 81), and said valve means (82) comprises an annular leaf spring washer mounted in said valve chamber (70) in a plane substantially transverse to the rotation axis of said drive member (10) and being arranged to be elastically deformed by the fluid pressure to thereby control the fluid flow through said communication openings (80,81).

4,683,962

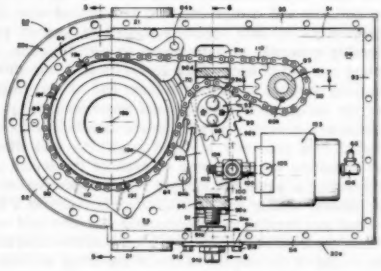
SPINNER FOR USE IN CONNECTING PIPE JOINTS

Martin E. True, 2203 Looscan La., Houston, Tex. 77019

Filed Oct. 6, 1983, Ser. No. 539,753

Int. Cl.[4] E21B *19/16*

U.S. Cl. 173—163 **4 Claims**



1. A jawless kelly spinner comprising:

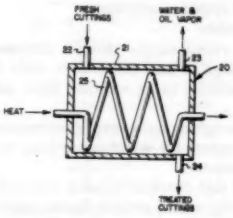
(a) a frame defining a chamber, said frame having vertically aligned openings therein;
(b) a spinner mandrel extending through said openings;
(c) fluidly powered drive means in said chamber rotatably mounted to said frame, said drive means comprising a hydraulically powered motor;
(d) endless flexible spinning means comprising a multistrand roller chain in said chamber in engagement with said drive means for normally slackly completely circling said drive means and said spinner mandrel whereby said spinner mandrel can rotate independently of said endless flexible spinning means;
(e) hydraulically powered clutch means in said chamber including an idler sprocket in engagement with said multistrand roller chain and tensioning means for moving said idler sprocket laterally in respect of the normal path of travel of said multistrand roller chain to decrease the slack in said multistrand roller chain sufficiently to force the inner surface of said multistrand roller chain into frictional driving engagement with said spinner mandrel to rotate said flexible driving means in a predetermined direction and to thereby spin said spinner mandrel in said direction,
(f) hydraulic control means hydraulically interconnected with said rotatable drive means and said clutch means for energizing said motor, actuating said hydraulically powered clutch means and controlling the direction of rotation of said drive means, and
(g) adjusting means mounted on said frame and engageable with said tensioning means for regulating the lateral movement of said idler sprocket.

4,683,963

DRILLING CUTTINGS TREATMENT

James L. Skinner, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Apr. 25, 1985, Ser. No. 727,311
Int. Cl.[4] E21B *21/06*; C09K *7/00*
U.S. Cl. 175—66 **8 Claims**



1. In drilling apparatus for drilling a wellbore in the earth wherein the drilling operation generates a substantial amount of a mixture of solid drilling cuttings, water and at least one hydrocarbonaceous oil, and said mixture is heated at least one time to vaporize essentially all said water and oil to produce essentially dry, oil-free cuttings and at least one stream composed of a mixture of vaporized water, oil and entrained solid fines, a system comprising condensing means for mixing said at least one stream of vaporized water, oil, and solid fines with a cooling liquid to condense said vaporized water and oil to the liquid state, and separator means for separating said water, oil and solid fines from one another, and for separately recovering each so that said separately recovered water and oil streams are essentially free of solid fines, said separator means comprising a separator vessel having an inlet conduit opening into a chamber in said vessel and at a point below a water-oil interface in said chamber when said water, oil and solid fines are being separated, separate outlet conduits for discharging separated water, oil and solid fines, respectively, from said vessel, means for conveying a slurry of water and solid fines from said vessel to dryer means for said mixture, and means for recirculating at least one of said separated water and oil to said condensing means for use as said cooling liquid.

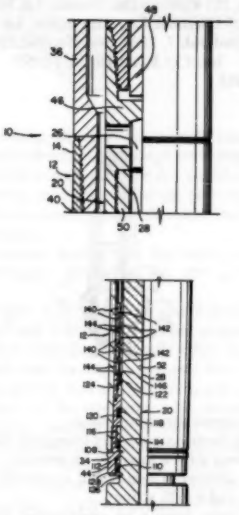
2. In a method for recovering solids such as drill cuttings formed from a drilling operation and the like wherein the drilling operation generates a substantial amount of a mixture of solid drill cuttings, water and at least one hydrocarbonaceous oil, and dryer means is provided for receiving said mixture and said mixture is heated in said dryer means to vaporize essentially all said water and oil to produce an essentially dry, oil-free cuttings stream and to produce separate from said cuttings stream at least one stream composed of a mixture of vaporized water and oil and retained solid fines, the improvement comprising mixing said at least one stream of vaporized water, oil and solid fines with a cooling liquid to condense said vaporized water and oil to the liquid state, passing cooling liquid and condensed water and oil liquid to a separator vessel to be held therein until said oil and water separate from one another and said solid fines settle to the bottom of said vessel, separating said water, oil, and solid fines from one another, separately recovering each of said water, oil and solid fines so that said separately recovered water and oil streams are essentially free of said solid fines and conveying said solid fines from said separator vessel to said dryer means for entrainment in said mixture.

4,683,964

DOWNHOLE DRILL BIT DRIVE APPARATUS

Kenneth H. Wenzel, Edmonton, Canada, assignor to Maxi-Torque Drill Systems, Inc., Edmonton, Canada

Filed Oct. 25, 1985, Ser. No. 791,217
Int. Cl.[4] E21B *4/14*
U.S. Cl. 175—107 **13 Claims**



1. In a downhole drill bit drive apparatus having a tubular housing adapted to be secured to the downhole end of a drill string, a mandrel concentrically disposed within said housing and having one end adapted to be secured to a downhole rotary drive means and an other end adapted to be secured to a drill bit, bearing means disposed between said housing and said mandrel to permit rotation of said mandrel with respect to said housing and transmit axial and radial loads between said housing and said mandrel, said housing and said mandrel defin-

ing a fluid flow passage for transmitting drilling fluid to a drill bit secured to said mandrel, the improvement comprising:

first seal means at one end of said bearing means, said first seal means defining one end of a bearing chamber for housing said bearing means and a lubricating fluid for lubricating said bearing means and being operable to seal said chamber from said fluid flow passage and maintain the pressure in said flow passage and in said chamber substantially at equilibrium;

second seal means at the other end of said bearing means, said second seal means defining the other end of said bearing chamber and being operable to seal said chamber from the exterior of said chamber;

said first seal means including an annular piston chamber, said housing defining an outer wall of said piston chamber and said mandrel defining an inner wall of said piston chamber, one end of said piston chamber communicating with said fluid flow passage, the other end of said piston chamber communicating with said bearing chamber, annular piston means concentrically disposed within said piston chamber in sealing engagement with said inner and outer walls of said piston chamber, said piston means being axially movable in said piston chamber in response to a pressure differential between the fluid pressure in said fluid flow passage and the fluid pressure in said bearing chamber to a position whereat said fluid pressures are substantially equal; further including roller bearing means for rotating mounting said piston means on said mandrel to permit rotation of said mandrel with respect to said piston.

4,683,965

TRIANGULAR OIL WELL DRILL BIT FOR USE IN UNCONSOLIDATED FORMATIONS

Paul G. Walton, 211 Hamner Dr., Houma, La. 70364, and Percy A. Little, 5825 Cherokee La., Alexandria, La. 71301

Filed Jul. 7, 1986, Ser. No. 882,228

Int. Cl.[4] E21B *10/26, 10/60*

U.S. Cl. 175—385 **8 Claims**

1. A drill bit apparatus comprising:

a. a tool body having a generally triangular horizontal cross-sectional area with a lowered tip portion;

b. means for forming a removable connection between the tool body and a drill string;

c. the tool body having an open-ended flow conveying longitudinal internal bore for circulating fluids between the tool body and a drill string connected thereto;

d. three longitudinal, radially spaced apart blade members each mounted upon the tool body;

e. three generally flat flow zone surfaces which span between the blade members that each define substantially vertical surface areas and three corresponding inclined surface areas that each respectively connect with the vertical surfaces, the substantially vertical surfaces generally defining an upper, large horizontal cross-section of the tool body and the inclined surfaces generally defining a lower, tapered section of the tool body;

f. at least one of said blade members having contact surface area means carried thereon for defining the radial dimensional limit of the tool body during a rotation of the tool body and a connected drill string; and

g. one or more jets extending between the tool bore and the flat flow zone surfaces at the tapered section of the tool body above the tip portion.

4,683,966

WEIGHING SYSTEM

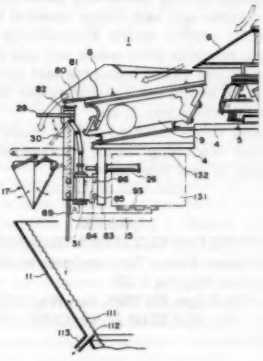
Yukio Nakagawa, Kyoto; Yukio Kakita, and Kazumi Kitagawa, both of Shiga, all of Japan, assignors to Ishida Scales Mfg. Co., Ltd., Kyoto, Japan

Filed Sep. 20, 1985, Ser. No. 778,504

Claims priority, application Japan, Sep. 20, 1984, 59-143245[U]; Sep. 20, 1984, 59-143246[U]; Apr. 25, 1985, 60-87456

Int. Cl.[4] G01G *19/22, 21/28;* **B65G** *27/28*

U.S. Cl. 177—25 **15 Claims**



1. A weighing system comprising:

a distributive table;

a plurality of radial supply troughs disposed around the peripheral edge of said distributive table for being supplied with articles to be weighed from said distributive table;

a plurality of weighing units supporting respective openable weighing hoppers for weighing articles supplied to said weighing hoppers;

at least one of said distributive table and said radial supply troughs having a slide surface slanted radially outwardly to a large extent for allowing the articles to slide thereon;

each of said radial supply troughs having a radially outer distal end disposed over one of said weighing hoppers;

a collection chute disposed below said weighing hoppers; and

a liquid drain device disposed at the distal end of each of said radial supply troughs.

4,683,967

WEIGHT MEASURING DEVICE

Sakio Hanatani, Takaichi, and Tuguharu Yakushiji, Sakai, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 25, 1985, Ser. No. 801,340

Claims priority, application Japan, Nov. 27, 1984, 59-180511[U]; Dec. 14, 1984, 59-190657[U]; Dec. 28, 1984, 59-197514[U]

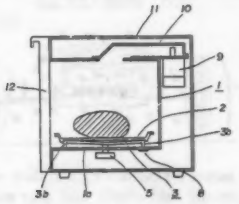
Int. Cl.[4] G01G *19/52, 3/14, 19/00;* **H05B** *6/64*

U.S. Cl. 177—144 **34 Claims**

1. A weight measuring device for a heating appliance comprising:

table means for supporting an object thereon;

base means for supporting the table means;
a bottom plate that supports said base means on a top surface thereof;
piezoelectric transducer means disposed adjacent a locus of the base means on said bottom plate support and on a



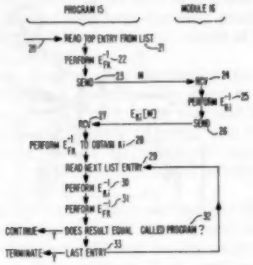
bottom surface of said bottom plate, for outputting a voltage indicative of the weight of the object;
detecting means for detecting the voltage from the piezoelectric transducer means; and
weight measuring means for measuring the weight of the object based on the output of the detecting means.

4,683,968

SYSTEM FOR PREVENTING SOFTWARE PIRACY EMPLOYING MULTI-ENCRYPTED KEYS AND SINGLE DECRYPTION CIRCUIT MODULES

Matthew A. Appelbaum, Boulder; David B. Lehman, Westminster; Donald J. Nieglos, Boulder; Stanley C. Nolte, Lafayette, and Michael P. Oehler, Boulder, all of Colo., assignors to Burroughs Corporation, Detroit, Mich.

Filed Sep. 3, 1985, Ser. No. 771,901
Int. Cl.[4] H04L *9/00*
U.S. Cl. 380—4 **10 Claims**



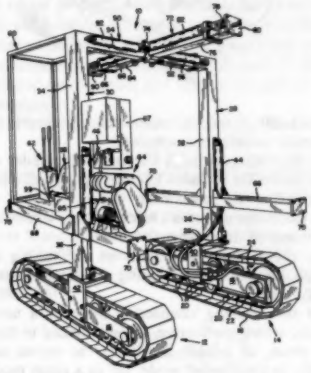
1. A system for enabling a protected program to run on only a selected plurality of computers, comprising:
a respective triple encrypted key for each of said computers of the form $E_{FK}[E_{Ki}[E_{FK}[Ki]]]$ where Ki is an unencryped key that is unique to each of said computers, E_{Ki} is an encryption procedure E which uses key Ki, and E_{FK} is the same encryption procedure E using a single fixed key FK for all of said computers;
a respective unique module coupled to each computer of said plurality for performing a decryption procedure E_{Ki}^{-1} where Ki is unique to each module;
a checker program in each computer which responds to requests to use said protected program by performing a single decryption procedure E_{FK}^{-1} on said triple encrypted key and sends the result to said module as a message M;
said module being adapted to perform said single decryption procedure E_{Ki}^{-1} on said message M and send $E_{Ki}^{-1}[M]$ back to said computer;
a means in said checker program for receiving $E_{FK}^{-1}[M]$ from said module and for performing another single decryption procedure E_{FK}^{-1} on it to obtain key Ki;
an identifier that is encrypted with said key Ki; and
a means in said checker program for using key Ki to decrypt said identifier, and for proceeding with the execution of said protected program only if it is identified by the decrypted identifier.

4,683,969

DIMENSIONALLY-ADJUSTABLE STRADDLE-TYPE CROP-WORKING VEHICLE

Eugene G. Littau, 8974 Shaw Square Rd., SE., Aumsville, Oreg. 97325

Filed Sep. 27, 1985, Ser. No. 780,843
Int. Cl.[4] B66C *5/04;* **B62D** *55/06*
U.S. Cl. 180—6.48 **3 Claims**



1. A crop-working, straddle-type vehicle comprising:
first and second elongate horizontal traveling frames, laterally spaced from each other in the vehicle;
ground-traveling means mounted on each of the traveling frames whereby each frame is movable over the ground in a stable manner;
a pair of hydraulic motors, one for each ground-traveling means, drivingly connected to the ground-traveling means;
a single, upright mast joined to and extending upwardly from one of said frames and another single, upright mast joined to and extending upwardly from the other of said frames, each mast having an elongate lower section fixed to a traveling frame and an elongate upper section forming the upper part of the mast adjustably extensible from the lower section, and power-operated means interposed between the sections for producing adjustable extension of the upper section from the lower section;
a motor-driven pump positioned adjacent and mounted on one of said masts, supplying pressurized hydraulic fluid to said hydraulic motors;
a substantially horizontal beam assembly interconnecting upper extremities of the upper sections of said first-mentioned and other mast whereby the masts depend from the horizontal beam assembly and the masts and beam assembly form a channel-shaped arch defining a passage for the movement of a crop therethrough, said masts and said horizontal beam assembly constituting the sole structurally unifying framework interconnecting said traveling frames; and
an operator's station including means for carrying an operator, and support means for the operator's station having

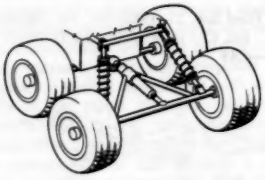
the operator's station mounted thereon, said support means being joined to one of said masts and extending longitudinally of the vehicle and positioning the station below the horizontal beam assembly and above a ground-traveling frame and at one side of the passage defined by the channel-shaped arch.

4,683,970

TRAILER FOR ALL-TERRAIN VEHICLE

Morley L. Smith, Beaconsfield, Canada, assignor to Ontario Drive and Gear Limited, New Hamburg, Canada

Filed Apr. 17, 1986, Ser. No. 853,228
Int. Cl.[4] B62J *15/00*; B62R *5/00*
U.S. Cl. 180—15 14 Claims



1. Detachable all-terrain trailer which is suitable for use with an all-terrain vehicle, characterised
in that the trailer includes a frame and a trailer axle;
in that the trailer includes left and right road wheels, one at each end of the trailer axle;
in that the trailer includes a hitching link, which is secured to the frame of the trailer;
in that the hitching link includes a hitching connection, which is suitable for attaching the link to a hitching point on the vehicle;
in that the hitching connection includes a universal-joint means, which is effective, when attached to the said hitching point, to permit the trailer to move, substantially freely, in a universal mode, i.e. in a pitch mode, in a roll mode, and in a yaw mode, relative to the vehicle;
in that the trailer includes a spring means;
in that the spring means is suitable for attachment to, and for operative engagement with, the rear of the vehicle;
in that the spring means is so constructed and arranged that the spring means acts, when attached to the vehicle:
(a) to resiliently urge the rear of the vehicle upwards, thereby to transfer some of the weight of the vehicle to the trailer; and at the same time
(b) in the event that the trailer becomes deflected to right or left of the vehicle in the yaw mode, about the hitching connection, to resiliently urge and restore the trailer positively to a directly trailing position, in line behind the vehicle.

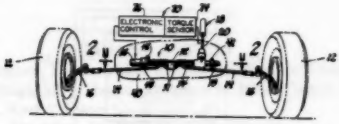
4,683,971

CONCENTRIC MOTOR ELECTRIC POWER STEERING FOR RACK AND PINION GEAR WITH CENTER TAKE-OFF

Kenneth L. Westercamp, Frankenmuth; Donald J. Kurecka, Saginaw, both of Mich., and David C. Yeack, Whitehouse, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 13, 1985, Ser. No. 776,128
Int. Cl.[4] B62D *5/04*
U.S. Cl. 180—79.1 3 Claims

1. A power assisted steering gear for steering the dirigible wheels of a vehicle comprising a housing, a steering gear rack disposed for linear movement within said housing, a pinion gear rotatably operated by a steering force input applied by a vehicle operator operatively meshing with the rack for linearly moving said rack, connector means operatively connecting said rack with the dirigible wheels of the vehicle for steering said wheels in response to the linear movement of said rack, a ball nut rotatably mounted adjacent to one end of said rack housing, a linearly movable screw operatively attached to one end of said rack and operatively extending through said ball nut for linear movement in response to rotation of said ball nut, and electric motor means mounted to one end of said rack



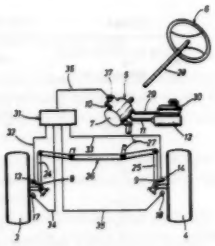
housing, said motor means having a hollow output shaft telescopically receiving said screw, and gear means operatively driven by said hollow output shaft and operatively connected to said ball nut to rotatably drive said ball nut to linearly move said screw and said rack in response to predetermined mechanical force input applied to said pinion gear by said vehicle operator for power assist steering.

4,683,972

STEERING SYSTEM WITH AUXILIARY FORCE ASSIST FOR VEHICLES IN WHICH A CENTRAL STEERING LIMIT VALVE IS CONNECTED WITH THE PUMP PRESSURE LINE OF A STEERING ASSIST PUMP

Hans-Joachim Foerster, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 10, 1986, Ser. No. 928,520
Claims priority, application Fed. Rep. of Germany, Nov. 8, 1985, 3539607
Int. Cl.[4] B62D *5/06*
U.S. Cl. 180—142 4 Claims



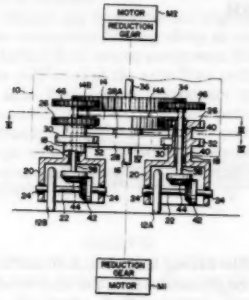
1. A steering system with an auxiliary force assist for vehicles in which vehicle wheels are drivingly operatively connected by a steering gear means with a manual steering wheel and also with a pressure medium servo motor means, comprising steering limit valve means operable to reduce the working pressure of the servo motor means upon reaching a maximum value of the deflection angle of a vehicle wheel as determined by mechanical end abutment means at the vehicle, a steering assist pump means operatively connected with the servo motor means including a pump pressure line, said steering limit valve means being connected with said pump pressure line and being operable to be controlled by sensor means influenced by the deflection angle, said sensor means being arranged at the end abutment means and being operable to produce a control signal varying with the deflection angle, and said steering limit valve means being an analog valve means operable to be influenced by the control signal in such a manner that the working pressure is reduced as a function of the increase of the deflection angle.

4,683,973

OMNIDIRECTIONAL VEHICLE

Yoshiaki Honjo, and Masaharu Shioya, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 1, 1986, Ser. No. 846,932
Claims priority, application Japan, Apr. 10, 1985, 60-75568
Int. Cl.[4] B60K *17/30*
U.S. Cl. 180—252 **19 Claims**



1. An omnidirectional vehicle having at least three wheels which can be steered in a given direction to allow the vehicle to travel in any direction, comprising:

a body;

a large-diameter steering gear horizontally mounted at a central portion of said body so as to be rotatable, wherein said large-diameter steering gear has toothed portions formed only on portions meshed with said small-diameter steering gears and the number of teeth in each one of said toothed portions is sufficient to finally direct said corresponding wheel in tangential direction of a circle passing through all of said at least three wheels;

a motor for driving said large-diameter steering gear;

steering shafts numbering the same as said wheels, extending vertically around said large-diameter steering gear and adapted to rotatably support said wheels at lower ends of said steering shafts;

small-diameter steering gears numbering the same as said steering shafts and concentrically fixed to said steering shafts, respectively, so as to mesh with said large-diameter steering gear and adapted to rotate said steering shafts upon rotation of said large-diameter steering gear to change the steering directions of said wheels supported by said steering shafts;

a wheel direction lock wheel concentrically fixed to a drive shaft of said large-diameter steering gear so as to be rotated together therewith and having projecting portions projecting radially outward from positions located between said toothed portions; and

locked wheels concentrically fixed to said steering shafts to be rotated together therewith and adapted to be prevented from rotating by said projecting portions of said wheel direction lock wheel when said small-diameter steering gears are disengaged from said corresponding toothed portions of said large-diameter steering gear.

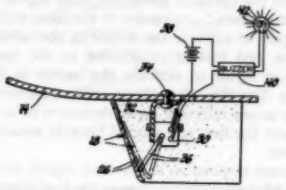
4,683,974

WARNING SYSTEM FOR VEHICLE AIR DAM

Truman R. Richardson, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 14, 1986, Ser. No. 851,955
Int. Cl.[4] B60R *21/00*
U.S. Cl. 180—274 **2 Claims**

1. In combination, a motor vehicle having an air dam mounted upon and beneath the front end structure forwardly of the front wheels, said air dam being comprised of a molded plastic deflector panel being subject to engagement with a parking bumper or other obstruction and elastically yieldably movable upon such engagement within a range of elastic deformation and being breakable upon deformation beyond the limit of the range of elastic deformation, switch means mounted on the front end structure rearwardly of the molded plastic deflector panel and having associated sensor means operatively associated with the deflector panel and adapted to actuate the



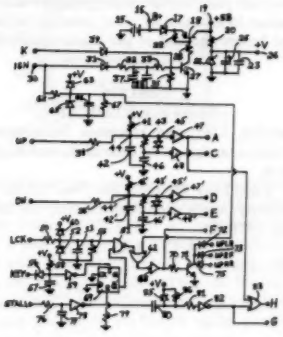
switch in response to yielding movement of the deflector panel within the range of elastic deformation, and signal means responsive to actuation of the switch means to warn the vehicle operator that an obstruction has been engaged and that further forward movement of the vehicle may exceed the limit of the range of elastic deformation and subject the plastic deflector panel to breakage.

4,683,975

VEHICLE POWER WINDOW CONTROL

Thomas L. Booth, Birmingham; Edgar H. Schlaps, Washington, and Ronald J. Wilde, St. Clair Shores, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 30, 1986, Ser. No. 913,531
Int. Cl.[4] B60R *25/04;* **F05B** *47/00;* **H02P** *1/22*
U.S. Cl. 180—289 **3 Claims**



1. A power window control for a vehicle having a door, a window driveable by an electric motor between open and closed positions, a source of DC electric power, an ignition switch having on and off positions to control access to the source of DC electric power, means for detecting an ignition key in the ignition switch with the vehicle door open and generating a key signal in response thereto and a door lock electrically activatable in response to a lock signal, the control comprising, in combination:

first and second bistable means effective to generate open and close window activation signals, respectively, in a first state and no such signals in a second state;

circuit means responsive to an operator generated close signal to set the first bistable means to its first state and, if the signal is still present after a predetermined time period, to reset the first bistable means to its second state and generate the close window activation signal indepen-

dently of the first bistable means during continuation of the operator generated close signal;

circuit means responsive to an operator generated open signal to set the second bistable means to its first state and, if the signal is still present after a predetermined time period, to reset the second bistable means to its second state and generate the open window activation signal independently of the second bistable means during continuation of the operator generated open signal;

motor control means responsive to the close window activation signal to activate the motor in the window closing direction and further responsive to the open window activation signal to activate the motor in the window opening direction, the motor control means further including means effective, upon detection of motor stall, to reset both the first and second bistable means to the second state;

circuit means responsive to the lock signal, an ignition off signal and the key signal to reset the first bistable means to its second state and set the second bistable means to its first state to produce automatic window closing when the lock signal occurs, unless the ignition switch is in its on condition or the key is in the ignition switch with the door open;

an obstruction sensor responsive to the blocking of the window by an obstruction in the window closing direction short of the fully closed position to reset the second bistable means to its second state and set the first bistable means to its first state;

power supply means effective to control the connection of the source of DC electric power to all the various circuit means, the first and second bistable means and the motor control means, the power supply means being responsive to a vehicle ignition on signal to so connect the source of DC electric power and to a vehicle ignition off signal to disconnect the source of DC electric power after a predetermined time delay, the power supply means being further responsive to keep the source of DC electric power so connected past the end of the predetermined time delay in response to an open or close window activation signal initiated before the end of the predetermined time delay.

4,683,976

SERVICE VEHICLE

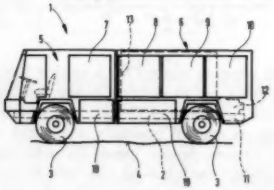
Walter Hawelka, Linz, and Hermann Staudinger, Neuhofen, both of Austria, assignors to Konrad Rosenbauer KG, Leonding, Austria

Filed May 13, 1985, Ser. No. 733,515

Claims priority, application Austria, May 18, 1984, 1642/84; Dec. 6, 1984, 3870/84

Int. Cl.[4] A62C *27/16*

U.S. Cl. 180—311 **22 Claims**



1. A service vehicle comprising an uninterrupted vehicle framework having a main bearer extending in a longitudinal direction of the vehicle, the main bearer having an angled portion, a driver's cab, a front driving axle and a rear driving axle carrying wheels and supporting the vehicle framework, the driving axles being spaced apart in the longitudinal direction to define a longitudinally extending space therebetween, a driving engine situated on the vehicle framework between a stern of the vehicle and said longitudinally extending space, a transmission between the driving engine and the driving axles, and an auxiliary unit mounted on the vehicle frame work frontwards of the front driving axle.

4,683,977

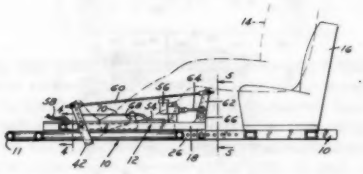
ADJUSTABLE PEDAL ASSEMBLY

Michael E. Salmon, Flint, Mich., assignor to Thomas Murphy, Marco Island, Fla.

Filed May 15, 1985, Ser. No. 734,473

Int. Cl.[4] B60K *26/00*

U.S. Cl. 180—334 **11 Claims**



1. In a vehicle having a chassis, a driver's seat and foot pedals spaced longitudinally from the seat, an adjustable pedal assembly permitting longitudinal adjustment of the pedals relative to the seat comprising:

a frame lying in a horizontal plane having a transverse member slidingly cooperating with the vehicle chassis and shiftable longitudinally relative thereto and having a longitudinal member attached to the center of the transverse member and extending toward the driver's seat having an end for locking to the chassis;

means for adjustably locking the frame transverse member end to the chassis at various longitudinal positions;

one or more foot pedals supported on the frame for rotation about a transverse axis wherein the transverse pedal axis is horizontal and bisects the pedal into a toe region and a heel region thereby allowing the pedal to act as a structural foot support; and

means for power transmission fixed to the frame and cooperating with one or more foot pedals to provide outputs in response to the rotation of the pedals by the driver.

4,683,978

EXHAUST SILENCER

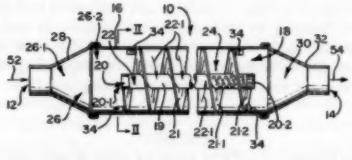
Philippus Venter, Vryburg, South Africa, assignor to Tula Silencers (Propriety) Limited, Vryburg, South Africa

Filed Nov. 18, 1985, Ser. No. 798,876

Claims priority, application South Africa, Nov. 22, 1984, 84/9090; Feb. 13, 1985, 85/1088

Int. Cl.[4] F01N *1/12*

U.S. Cl. 181—280 **6 Claims**



1. An exhaust silencer having an axial inlet opening and an axial outlet opening spaced axially from the inlet opening, and which includes

a cylindrical shell;

a central axial tube within and co-axially aligned with the shell and with the silencer inlet and outlet openings, the said tube defining an axial flow passage and being open at

its upstream end and closed by a transverse barrier at its downstream end, the axial flow passage having its outlet in the downstream end of the said tube transversely through the wall of the said tube, upstream of the transverse barrier, the open upstream end of the tube being spaced axially downstream from the silencer inlet opening; and

a helical vane around the tube and defining a helical passage around the tube within the shell.

6. A method of silencing the exhaust of an internal combustion engine, which includes

splitting the exhaust gas flow from the engine into an axial flow stream component flowing along an axial flow path, and into a helical flow stream component flowing along a helical flow path around the axial flow path; and

causing the axial flow stream component to flow transversely outwardly out of the axial flow path outlet within the downstream third of the axial flow path, to intersect and to merge with the helical flow component, to form a unitary flow stream flowing downstream away from the region of intersection.

4,683,979

CO-OSCILLATING, VOLUME-CHANGING RESONATOR IN THE FORM OF A SILENCER

Michael Ghibu, Puchheim; Volker Hartel, Germering; Carl Heynemann, Taufkirchen, and Manfred Raubach, Olching, all of Fed. Rep. of Germany, assignors to Metzeler Kautschuk GmbH, Munich, Fed. Rep. of Germany

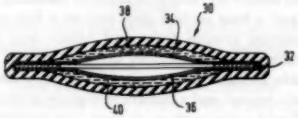
Division of Ser. No. 608,778, May 10, 1984, Pat. No. 4,570,748. This application Aug. 26, 1985, Ser. No. 769,858

Claims priority, application Fed. Rep. of Germany, May 10, 1983, 3317103

The portion of the term of this patent subsequent to Feb. 18, 2003, has been disclaimed.

Int. Cl.[4] E04B *1/82*

U.S. Cl. 181—286 **8 Claims**



1. Co-oscillating, volume-changing resonator in the form of a silencer, comprising a lens-shaped arched sheet metal housing having end regions, said housing defining an evacuated cup-shaped cavity formed therein, a coating layer completely surrounding said housing and being connected to said housing exclusively at said end regions defining an intermediate space between said housing and said coating layer, and a fluid with a specific weight greater than 0.8 g/cm^3 filling said intermediate space.

4,683,980

LADDER-LEVELING DEVICE

Don Vayko, 4185 Hill Dr., Utica, Mich. 48087

Filed Apr. 14, 1986, Ser. No. 851,250

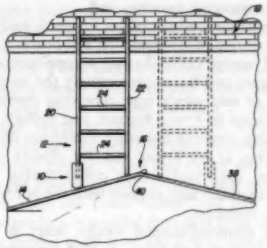
Int. Cl.[4] E06C *7/46*

U.S. Cl. 182—108 **8 Claims**

1. A compensator boot to facilitate the use of a ladder on an angled surface such as a roof, said boot comprising:

(A) a vertically elongated block of material having a generally rectangular transverse cross section having major side face dimensions and minor end face dimensions;

(B) a vertically extending socket in said block opening in the upper end face of the block, having a generally rectangular transverse cross section with major and minor dimensions respectively paralleling the major and minor dimensions of said block, being sized to allow the lower end of a leg of the ladder to slide into the socket, and having a blind lower end spaced vertically from the lower end face of said block by a distance compensating for the roof angle; and



(C) means defining a flat contact surface on said lower end face that extends from end face to end face of said block and is skewed with respect to the vertical axis of the block to match the roof angle.

4,683,981

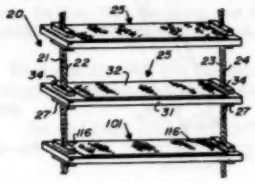
MOLDED HARD ELASTOMER STEPS AND REPLACEMENT AND SPREADER STEPS FOR ROPE LADDERS AND FITTINGS THEREFOR, AS WELL AS MOLDING METHOD THEREFOR

Robert M. Salvarezza, 110 Braemar Dr., Hillsborough, Calif. 94010

Filed Aug. 4, 1986, Ser. No. 892,376

Int. Cl.[4] E06C *1/56*

U.S. Cl. 182—199 **32 Claims**



1. In a rope ladder of the type having a series of ladder steps, and two spaced-apart pairs of ropes, the combination of:

a metal step frame with a pair of longitudinal members joined by a pair of shorter transverse members spaced in from the ends and strengthened by a pair of diagonal members, and having at each end a metal bracket bridging across the pair of longitudinal members and having vertical portions leading to an upper plate portion, which defines a generally rectangular opening, each said upper plate portion having a vertical through opening at each end, one spaced from each end of said rectangular opening, each said longitudinal member having vertical through openings accurately aligned with the through openings of said upper plate portion, to make sets of said vertical through openings,

tubular nylon members with cylindrical bores, extending vertically through said sets of through openings and assuring their accurate alignment,

a molded hard elastomer body molded around said frame and tubular nylon members and having a collar portion at each end molded around a said bracket, said body having a rope-receiving opening through each collar portion and the body therebelow and in line with the rectangular openings through said brackets, each said rope-receiving opening being narrow at its upper end for closely confining said pair of ropes and enlarging out transversely of the

step toward the lower end, each rope-receiving opening thus tapering inwardly from bottom to top, the bores of said tubular nylon members providing each said step with vertical bolt openings through said body adjacent each said rope-receiving opening, and

a pair of separate wedge collars for each said step, one at each end of and below said step and bearing up against it, each said wedge collar having a rope-receiving opening whose upper end has approximately the same dimensions as those of said step's rope-receiving opening where it emerges from its lower surface, said collar's rope-receiving opening tapering inwardly therefrom down to a narrow portion at the lower end, for closely confining the two ropes, each said wedge collar having vertical bolt passages therethrough aligned with the bores of said tubular nylon members,

a generally diamond-shaped wedge heart in between the ropes of each pair of ropes, in said rope-receiving openings, said wedge heart providing two rope-engaging side grooves for locking the pair of ropes in place and preventing relative movement between them and said step, and

fastening means extending through said bolt passages and said bores of said nylon members and tightened in place to hold said wedge collar and wedge heart in place and lock said ropes in fixed position relative to said step.

4,683,982

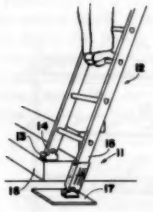
LADDER LEVELER APPARATUS

Gerald G. Baker, Missoula, Mont., assignor to Chester M. Murphy, Missoula, Mont., a part interest

Filed Oct. 6, 1986, Ser. No. 915,703

Int. Cl.[4] E06C *7/44*

U.S. Cl. 182—204 **14 Claims**



1. Ladder leveler apparatus including a frame portion, a support portion, an affixing portion, an aligning portion and a positioning portion; said frame portion including an elongated U-shaped section, said U-shaped section including a main section having a width slightly larger than the width of a ladder leg, transverse side sections extending from said main section adjacent side edges thereof along substantially the entire length of said main section, said side sections having a width at least about equal to the thickness of said ladder leg, said main section including at least one longitudinal channel section; said support portion including a foot member extending from one end of said frame portion, said foot member being pivotally connected to said ladder leg, said foot member including a connector section and a base section disposed on a free end of said connector section remote from said ladder leg; said affixing portion including at least one bolt member extending through said longitudinal channel section of said main section and through a transverse opening in said ladder leg, adjustable fastening means disposed on the free end of said bolt member to selectively secure said main section to said ladder leg; said aligning portion including means securable to said frame portion disposed closely adjacent to the periphery of said ladder leg remote from said main section; said positioning portion including a transverse pin member extending through aligned openings in said side sections; whereby said apparatus can be connected to a ladder leg with said bolt member, said apparatus slid along said ladder leg to a desired position, said fastening means tightened on said bolt member to fix the position of said main section on said ladder leg, said pin member inserted through said side sections and said aligning means secured to said frame portion to provide a safe extension of said ladder leg.

4,683,983

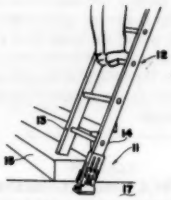
LADDER LEVELING APPARATUS

Chester M. Murphy, Missoula, Mont., assignor to Gerald G. Baker, Missoula, Mont., a part interest

Filed Oct. 6, 1986, Ser. No. 915,706

Int. Cl.[4] E06C *7/44*

U.S. Cl. 182—204 **14 Claims**



1. Ladder leveling apparatus including a frame portion, a support portion, a slider portion, a retainer portion and a positioner portion; said frame portion including an elongated U-shaped section, said U-shaped section including a main section having a width slightly larger than the width of a ladder leg, transverse side sections extending from said main section adjacent side edges thereof along substantially the entire length of said main section, said side sections having a width at least about equal to the thickness of said ladder leg, said main section including at least one longitudinal channel; said support portion including a foot member extending from one end of said frame portion, said foot member being pivotally connected to said ladder leg, said foot member including a connector section and a base section disposed on a free end of said connector section remote from said ladder leg; said slider portion including a guide member disposed within said channel, said guide member having a width slightly less than the width of said channel and a thickness slightly greater than the thickness of said main section, at least one opening through said guide member; said retainer portion including a plate member disposed over said guide member, said plate member having a width significantly larger than that of said channel, an opening through said plate member aligned with said guide opening, a bolt member extending through said plae and guide openings and extending beyond said main section a distance sufficient to pass through an opening through the thickness of said ladder leg, adjustable fastening means disposed on the free end of said bolt member securing said ladder leg to said guide and plate members; said positioner portion including a transverse pin member extending through aligned openings in said side sections; whereby said apparatus can be connected to a ladder leg with said bolt member and said fastening mens tightened thereon, said apparatus slid along said ladder leg to a desired position, and said pin member inserted through said side sections to provide a safe extension of said ladder leg.

4,683,984

SCAVENGE OIL SYSTEM

Mordehy Cohen; James L. Bettenga, and Brian Tjenstrom, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

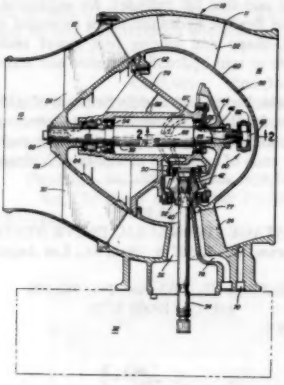
Filed Oct. 3, 1985, Ser. No. 784,325

Int. Cl.[4] F01M *3/00*

U.S. Cl. 184—6.2 **6 Claims**

1. In a mechanism operable at different attitudes and having a housing in which a driven shaft is rotatably mounted and

components including front and rear bearings associated with the driven shaft are also in said housing, said mechanism having a normal attitude with said driven shaft extending horizontally in said housing approximately midway the height thereof, means for lubricating said components with oil, and means for scavenging oil from said housing including a scavenge oil outlet at the bottom of the housing for removal of oil when the



mechanism is in attitudes to have oil flow by gravity to said scavenge oil outlet, and a scavenge pump located in and at the rear of said housing and having an impeller on an end of said shaft to the rear of the rear bearing for pumping scavenge oil for discharge from the housing when said mechanism is in an attitude to have the scavenge pump below said scavenge oil outlet.

4,683,985

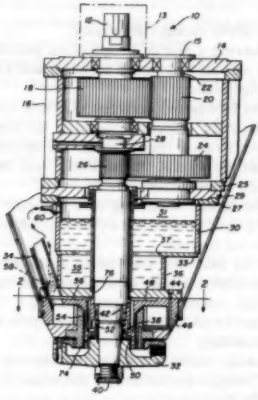
LUBRICATION SYSTEM FOR A VERTICAL GEAR UNIT

Claes L. Hultgren, Clarendon Hills, Ill., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 4, 1985, Ser. No. 688,840

Int. Cl.[4] F01M *9/00, 11/02, 1/08;* F16N *7/34*

U.S. Cl. 184—6.12 **3 Claims**



1. In a vertical gear unit having a downwardly extending output shaft, a motor for driving said shaft connected to the upper end thereof, and an impeller driven by said shaft connected to the lower end thereof, upper housing means defining an upper lubricating oil sump having lubricating oil stored therewithin, and lower housing means defining a lower lubricating oil sump for collecting lubricating oil exiting from a bearing for said shaft, said upper and lower housings being assembled and vertically spaced about the output shaft, with the upper housing being disposed vertically above the lower housing, wherein the improvement comprises:

said lower housing means having a surface facing said upper housing means, a first groove formed in the surface of the lower housing means which defines a first passage when said upper and lower housing means are assembled, said first passage being in communication with the lower sump, a second groove being formed in the surface which forms a second passage when said upper and lower housing means are assembled, said second passage also in communication with the lower sump, said first and second passages extending in a radial direction from the rotational axis of the output shaft from the lower sump to the exterior of the vertical gear unit;

pneumatic purge means for supplying air into said lower sump through said first passage for increasing the pressure therewithin to a level above the pressure within the upper sump;

conduit means connecting the upper and lower sumps through the second passage, with the relatively high pressure within the lower sump driving the lubricating oil collected therewithin upwardly into the upper sump;

a first labyrinth seal sealing between the upper housing means and the rotating downwardly extending output shaft and a second labyrinth seal sealing between the lower housing means and the rotating downwardly extending output shaft to isolate the lower sump from the upper sump to maintain the relatively high pressure within the lower sump.

4,683,986

SPRING DRIVE FOR TOY VEHICLES

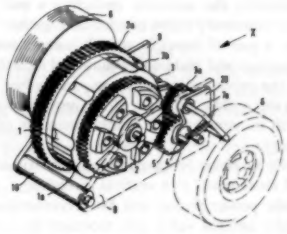
Helmut Darda, Im Tal, 7712 Blumberg, and Reinhold Schoch, Schlangenbühl 6, D-7230 Schramberg, both of Fed. Rep. of Germany

Filed Jan. 25, 1985, Ser. No. 695,071

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1984, 3403296

Int. Cl.[4] F03G *1/00;* F16H *5/08*

U.S. Cl. 185—39 **9 Claims**



1. A spring drive for toy vehicles comprising:

a spring having each of its ends connected to first and second spring gears,

a wind down/wind up shaft having unidirectional torque transmitters of opposite directions thereon, and drive pinions meshing with said spring gears for transferring torque of said shaft to one or the other of said spring gears,

a reverse pinion having an axle and two reverse pinion sprockets thereon, one said reverse pinion sprocket being constantly in mesh with a first said drive pinion, means supporting said other reverse pinion sprocket for movement into and out of mesh with the other said drive pinion, said supporting means including a spring wire forming a reverse pinion axle, spaced drive platens, one said drive

platen having an elongated opening, said reverse pinion axle supported in said drive platens and passing through said opening,

an engaging lever pivotally supported on the reverse pinion axle adjacent the platen having the elongated opening and movable with the reverse pinion axle in said elongated opening, and

means including said engagin lever for causing movement of said reverse pinion axle into a first position in which the reverse pinion sprockets engage said drive pinions and thereby block movement of the spring and into a second position in which a said reverse pinion sprocket is out of mesh with any drive pinion.

4,683,987

HYDRAULIC POWER PIPING UNIT FOR A LIFT TRUCK

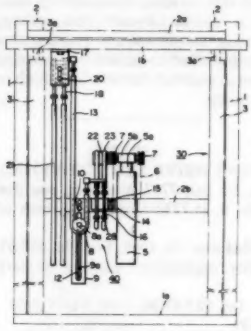
Masataka Sakata, Handa; Shigeo Takasu, Obu, and Yoshihiro Ikimi, Aichi, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Oct. 31, 1985, Ser. No. 793,635

Claims priority, application Japan, Nov. 12, 1984, 59-171891[U]; Nov. 13, 1984, 59-171058[U]; Nov. 13, 1984, 59-171059[U]

Int. Cl.[4] B66B 9/20

U.S. Cl. 187—9 E **14 Claims**



1. In a lift truck having a truck body and a full free lift upright assembly, the assembly including a pair of laterally spaced outer stationary masts connected together by at least a cross beam, a pair of laterally spaced inner masts connected together by upper and middle tie beams and movable vertically relative to the outer stationary masts, and a free lift cylinder attached to the middle tie beam of the inner masts for providing a free lift movement for a bracket member relative to the inner masts;

said middle tie beam being arranged approximately midway of said inner masts in a vertical direction;

a hydraulic power piping unit for a connection between a hydraulic control valve unit mounted in the truck body and a hydraulic actuator for an attachment to be mounted on the bracket member, comprising:

support means attached to said cross beam of said outer stationary masts, for holding a first assembly of hydraulic hoses extending toward said hydraulic control valve unit;

a first pulley means rotatably held by said middle tie beam of said moveable inner masts and vertically movable with respect to said middle tie beam of said movable outer masts, for guiding a second assembly of flexible hydraulic hoses hanging down in a loose U-shape and having first upper ends thereof connected to said first assembly of hydraulic hoses and second upper ends thereof, said first pulley means including an elongated support member extending from said middle tie beam which connects said inner masts, said support member having a vertical opening, a pulley shaft slidably supported in said vertical opening, and a pulley rotatably mounted on said pulley shaft;

spring biasing means for biasing said pulley downwardly in a vertical direction with respect to said middle tie beam of said movable inner masts to maintain said second assembly of hydraulic hoses in a taut condition during operation of said lift truck;

a second pulley means rotatably mounted on a vertical piston rod of said free lift cylinder, for supporting a third assembly of flexible hydraulic hoses extended in a loose inverted U-shape and having first lower ends thereof connectable to said hydraulic actuator and second lower ends thereof; and

joint means attached to said middle tie beam of said movable inner masts, for fluidly connecting said second upper ends of said second assembly of hydraulic hoses and said second lower ends of said third assembly of hydraulic hoses.

4,683,988

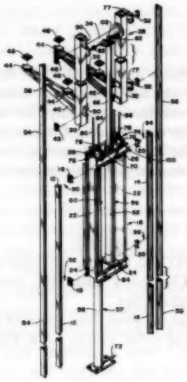
MULTI-STAGE HYDRAULIC DRIVE SYSTEM

William M. Shrum, Jr., 13007 S. Main St., Los Angeles, Calif. 90061

Filed Sep. 27, 1985, Ser. No. 782,800

Int. Cl.[4] B66B 9/20

U.S. Cl. 187—9 E **4 Claims**



1. Hydraulic drive means comprising:

base means having a pair of longitudinal parallel rails;

frame means movably mounted between said rails for longitudinal reciprocation;

bearing means interposed between said rails and said frame means, providing respective bearing surfaces lying in a plane normal to a line transverse to and spanning said rails, for transmitting lateral thrust along said line from said frame means to said rails;

first hydraulic means consisting of a first pair of members, one being a cylinder and the other being a piston reciprocally mounted therein;

one member of said first pair being mounted to said base means, the other member of said first pair being mounted to said frame means;

a carrier movably mounted between said rails for longitudinal reciprocation;

second hydraulic means consisting of a second pair of members, one being a cylinder and the other being a piston reciprocally mounted therein;

one member of said second pair being mounted to said frame means, the other member of said second pair being mounted to said carrier;

means for flowing hydraulic fluid into and out of said cylinders, thereby to extend and retract the respective said pistons;

the axis of said first pair of members being parallel to and laterally offset from the axis of said second pair of members;

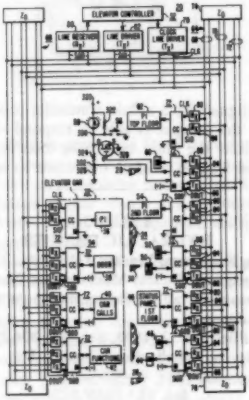
whereby in-flowing of hydraulic fluid into said cylinders effects extension of said pistons from their respective cylinders with consequent longitudinal movement of said frame and said carrier, the lateral offset between the axes of said first and second pair of members creating a lateral torque on said frame means which is transmitted to and resisted by said rails through said bearing means.

4,683,989

ELEVATOR COMMUNICATION CONTROLLER

Lawrence T. Pillage, Monroeville, and Arthur A. Anderson, Plum Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 14, 1986, Ser. No. 829,744
Int. Cl.[4] B66B *1/14*; G06F *15/20*
U.S. Cl. 187—121 **15 Claims**



1. An addressable elevator communication controller for receiving spaced serial input messages via a data link having a clock line for providing message clocking pulses, an input data line, and an output data line, with each input message including address and data portions, comprising:

address means providing a station address,

shift register means having a clock input, a serial input, a serial output, parallel inputs, and parallel outputs,

said shift register means having its clock input connected to the clock line and its serial input connected to the input data line for receiving each serial input message in synchronism with the message clocking pulses,

enable means for providing an enable signal when said shift register means receives a valid input message which includes said station address,

means responsive to said enable signal for unloading the data portion of a serial input message via the parallel outputs of said shift register means,

means for preparing a serial output message in said shift register means via said parallel inputs, after said shift register means has been unloaded,

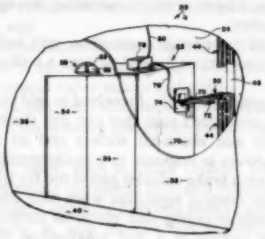
and means responsive to said enable signal for operatively connecting the serial output of said shift register means to the output data link, at least until the next serial input message has been received by said shift register means, whereby the loading of said next serial input message into said shift register means simultaneously clocks the serial output message to the output data line, regardless of the station address in the next serial input message.

4,683,990

RELATIVE POSITION MONITORING APPARATUS

Mark W. Wright, Russellville, Ark., assignor to Innovation Industries, Inc., Russellville, Ark.

Filed Aug. 29, 1985, Ser. No. 770,527
Int. Cl.[4] B66B *3/02*
U.S. Cl. 187—134 **42 Claims**



17. A solid state reader device for deriving and monitoring the travel of moveable objects such as an elevator car disposed for vertical displacement within a conventional elevator hoistway equipped with a plurality of similar spaced apart vanes, each of said vanes including an A row of periodically spaced apart perforations and a cooperating B row of periodically spaced apart perforations, said A row being offset from said B row of perforations; said reader device comprising:

means coupling said vane reader means for movement by said elevator car for generating digital position data from said vane means;

circuit means adapted to aim and intermittently receive a first beam of infrared light through said A row of perforations and to aim and intermittently receive a second beam of infrared light through said B row of perforations, said first beam of light being directed in a first direction and said second beam of light being directed in an opposite direction; and,

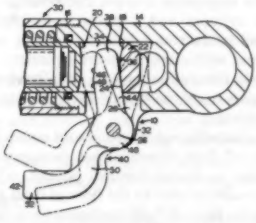
said vane reader circuit means being responsive to said first and second infrared beams of light for outputting a first pair of complementary digital signals A1 and NOT A1 derived from said A row and a second pair of complementary digital signals B1 and NOT B1 derived from said B row.

4,683,991

ACTUATING MEANS FOR A SLACK ADJUSTER OVERTRAVEL CONTROL MECHANISM

Wajih Kanjo, Midlothian, Ill., assignor to American Standard Inc., Chicago, Ill.

Filed Mar. 14, 1985, Ser. No. 711,553
Int. Cl.[4] F16D *65/40*
U.S. Cl. 188—197 **3 Claims**



1. A triggering mechanism, which actuates in response to a measured travel distance of a brake cylinder piston rod, an overtravel control apparatus in a railway vehicle brake rigging

slack adjuster assembly, said triggering mechanism comprising:

(a) an elongated hollow member secured at one end thereof to one end of a housing of such slack adjuster assembly;

(b) an abutment surface having a convex shape carried by an extension member secured to one end of such overtravel control apparatus and positioned to reciprocally move longitudinally in said hollow member, said abutment surface formed by an aperture extending through said extension member;

(c) a pivotal connection secured to said hollow member adjacent an aperture formed through a wall of said hollow member;

(d) a lever means pivotally connected to said pivotal connection and positioned such that one end thereof is engageable with said abutment surface and an opposite end thereof moves in response to a predetermined travel distance of such brake cylinder piston rod for triggering such overtravel control apparatus when said one end of said lever means engaging said abutment surface moves said abutment surface in a first longitudinal direction, said lever means including:

(i) a first elongated arm portion carrying an abutment surface adjacent one end thereof, said first arm portion including a tapered portion having a taper of at least about 15 degrees with respect to an arm surface opposite said abutment surface, said abutment surface engaging said convex shape of said abutment surface carried by said overtravel control extension member,

(ii) a pivot portion connected to an opposite end of said first arm portion for pivotally connecting said lever means to said pivotal connection,

(iii) a second elongated arm portion connected at one end thereof to said pivot portion and extending outwardly from said slack adjuster housing and toward an opposite end of said overtravel control apparatus, and

(iv) a third elongated arm portion connected at one end thereof to an opposite end of said second arm portion and extending toward said opposite end of said overtravel control apparatus and substantially parallel with said slack adjuster housing;

(e) a connectiag arm connected at one end thereof to said opposite end of said lever means and having a forked portion at an opposite end thereof engageable with said brake cylinder piston rod when said brake cylinder piston rod moves a preselected distance thereby triggering such overtravel control apparatus to adjust slack in such brake rigging.

4,683,992

VEHICLE SUSPENSION DAMPER WITH REMOTE CONTROL

Shunso F. Watanabe, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 13, 1985, Ser. No. 776,070

Int. Cl.[4] F16F *9/44*

U.S. Cl. 188—299 **1 Claim**

1. A vehicle suspension damper comprising:

a pressure cylinder and a piston assembly comprising a piston and piston rod;

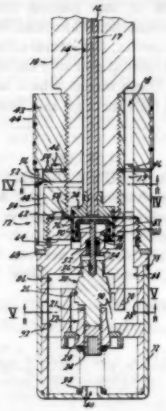
working fluid within said pressure cylinder;

a passageway through said piston for allowing said working fluid to pass from one side of said piston to the other side of said piston;

a linearly actuatable valve within said piston for controlling the flow of fluid through said passageway, said valve comprising a double-headed poppet which is force-balanced with respect to the flow of fluid acting upon the valve by the flow of fluid impinging upon the valve urging each poppet of the double-headed poppet in opposite axial directions with equal force;

a fluid motor within said piston for controlling said valve, with said motor comprising a pressure responsive rolling diaphragm and a cup-shaped cylindrical piston driven by said rolling diaphragm; and

an axial passage through said piston rod for communicating



pressure signals from a fluid controller to said fluid motor whereby the damper is able to respond very quickly to signals from the fluid controller because only inertial forces and friction need be overcome to move the valve.

4,683,993

HYDRAULIC DAMPER

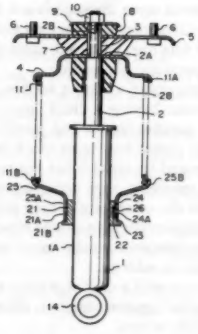
Hisao Tanabe, Kanagawa; Masaru Takahashi, Tokyo; Hiroyasu Ozawa, Kanagawa; Shoichi Machida, and Makoto Kitamura, both of Kanagawa, all of Japan, assignors to Tokico Ltd., Kanagawa, Japan

Filed Dec. 3, 1985, Ser. No. 804,257

Claims priority, application Japan, Dec. 4, 1984, 59-184194[U]; Apr. 19, 1985, 60-58645[U]

Int. Cl.[4] F16F *9/54*

U.S. Cl. 188—321.11 **3 Claims**



1. In a hydraulic damper including a tubular main body, a piston rod slidably extending axially through one end of said main body, an annular seat member secured to a peripheral wall of said tubular main body, biasing means acting between said seat member and the projecting end of said piston rod for biasing said piston rod in an extending direction, and a supporting member detachably connected to said seat member and constituting a part of said biasing means, the improvement wherein:

a resilient retaining member is provided on said seat member

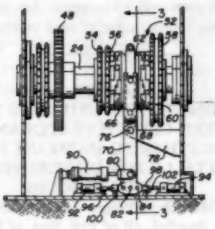
and a retaining recess is formed in said support member for engaging with said retaining member, thereby maintaining engagement between said retaining member and said seat member.

4,683,994

SHIFTING APPARATUS FOR A DRAWWORKS TRANSMISSION

Carl H. Weisenfelder, Beaumont, Tex., assignor to IRI International Corporation, Pampa, Tex.

Filed Apr. 12, 1985, Ser. No. 722,887
Int. Cl.[4] F16D *67/04, 47/06*
U.S. Cl. 192—3.61 **10 Claims**



7. Improved shifting apparatus for a drawworks transmission wherein said drawworks is the driven element driven by at least one engine which is the drive element, said engine having a remotely actuated engine clutch and includes a remotely actuated drawworks brake, said improved shifting apparatus comprising in combination:

a rotatable transmission shaft operatively connected with one of said elements;

means journaling said shaft;

a clutch member mounted for limited axial movement on said shaft and rotatable therewith;

a low speed member rotatable on said shaft adjacent to said clutch member, said low speed input member including a clutch portion engageable with said clutch member and being operably connected with said other element;

a high speed input member rotatable on said shaft adjacent to said clutch member, said high speed clutch member also including a clutch portion engageable with said clutch member and being operably connected with said other element;

shift means for moving said clutch member from a first position wherein said clutch member is not engaging either clutch portion, to a second position wherein said clutch member engages the clutch portion on said low speed input member to drive said drawworks at a speed, and to a third position wherein said clutch member engages the clutch portion on said high speed input member to drive said drawworks at a relatively higher speed;

retainer means for retaining said shift means in each of said three positions;

said shift means including:

a lever having one end operably connected to said clutch member;

means pivotally supporting said lever; and

a cylinder connected to said lever for pivoting said lever to shift said clutch member among said positions;

said retainer means including cylinder actuated means for engaging said lever when said clutch member is in each said position, said cylinder actuated means including:

a first cylinder carrying a lock member for engaging and retaining said lever in each said position; and

a pair of opposed cylinders for positioning and retaining said lever in said first position;

said lever having a plurality of holes sized to receive said lock member for positively retaining said lever in said positions;

control means operably connected with said remotely actuated clutch, brake, shift means and retainer means for cooperatively actuated each, said control means including:

a clutch control valve for actuating said engine clutch;

brake control valve means for actuating said brake, actuating said retainer means, and deactivating said engine clutch; and

a shift control valve for actuating said shift means to move said clutch member through said positions;

said brake control valve means including:

a normally open, pilot actuated clutch exhaust valve operably located between said clutch control valve and said clutch;

a normally open, pilot actuated retainer means exhaust valve operably connected with said retainer means; and

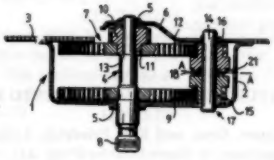
a brake control valve for directing fluid to said brake to set said brake, to said retainer means exhaust valve for closing said retainer means exhaust valve releasing said retainer means, to said clutch exhaust valve to close said clutch exhaust valve to release said engine clutch, and to said retainer means for releasing said retainer means whereby said shift means can move said clutch member.

4,683,995

ACTUATING DEVICE IN PARTICULAR FOR A VEHICLE WINDOW GLASS RAISING DEVICE

Pierre Periou, Cergy Pontoise, France, assignor to Compagnie Industrielle de Mecanismes en abrege C. I. M., France

Filed Feb. 19, 1986, Ser. No. 830,784
Claims priority, application France, Feb. 27, 1985, 85 02855
Int. Cl.[4] F16D *49/02;* **F16H** *57/10*
U.S. Cl. 192—8 C **7 Claims**



1. An actuating device for raising and lowering a vehicle window glass comprising:

a driving shaft,

a drive gear pinion mounted for rotation on the driving shaft,

an auto-lock mechanism connected to said pinion and to said driving shaft, comprising a pin fixed in position to be parallel to said drawing shaft, a first gear pinion, a second gear pinion freely mounted on said pin, and a spring mounted on said pin having end portions which are each interposed between axial portions of said first and second gear pinions,

means for releasing said auto-lock mechanism under the action of the driving shaft, and

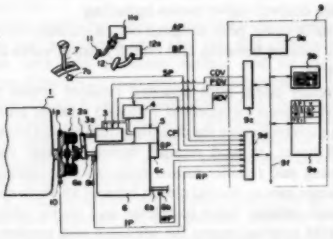
means for locking the auto-lock mechanism under the action of the drive gear pinion.

4,683,996

METHOD OF CONTROLLING AUTOMATIC TRANSMISSION

Toshihiro Hattori, Ayase; Nobuichi Uchiyama, Fujisawa; Yasuyoshi Asagi, Kawasaki; Noriaki Ogawa, Tokyo, and Hitoshi Kasai, Kawasaki, all of Japan, assignors to Isuzu Motors Limited, Tokyo and Fujitsu Limited, Kawasaki, both of, Japan

Filed Dec. 24, 1984, Ser. No. 685,556
Int. Cl.[4] F16D *23/10, 21/04*
U.S. Cl. 192—0.033 8 Claims



1. A method of controlling a synchromesh type automatic transmission in a vehicle having an engine and a clutch, comprising the steps of:

(a) releasing the clutch in response to a speed change command;

(b) shifting the transmission from a former speed position to neutral;

(c) multiplying a first value corresponding to the speed of the vehicle by a reduction ratio corresponding to a subsequent speed position;

(d) detecting a synchronization load in accordance with the difference between the product of the first value and the reduction ratio and a second value corresponding to the r.p.m. of the engine;

(e) comparing the detected synchronization load with a predetermined synchronization load, and controlling the r.p.m. of the input shaft of the transmission by engaging the clutch while the transmission is in neutral until the detected synchronization load is less than the predetermined synchronization load and then releasing the clutch;

(f) shifting said transmission from neutral to a subsequent speed position; and

(g) applying said clutch.

4,683,997

TEMPERATURE COMPENSATING FLUID FRICTION CLUTCH

Jürgen Stockmar, Graz, and Karl Friedrich, Leibnitz, both of Austria, assignors to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Jan. 21, 1986, Ser. No. 821,028
Claims priority, application Austria, Jul. 2, 1985, 1960/85
Int. Cl.[4] F16D *35/00, 43/25*
U.S. Cl. 192—58 C 7 Claims

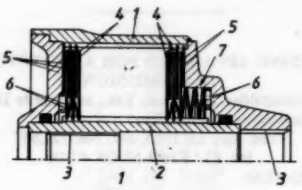
1. A fluid friction clutch, comprising

a housing, said housing being substantially filled with a viscous fluid,

a shaft disposed within said housing,

mutually interengaging first and second plate elements, said first and second plate elements being coupled to said shaft and said housing respectively for rotation about an axis within said housing, said first and second plate elements defining gaps therebetween and being rotationally coupled to each other by said viscous fluid within said gaps, said first and second plate elements being axially displaceable to vary the magnitude of said gaps, and

spacers disposed within selected ones of said gaps, said spacers being made from a temperature responsive material, said temperature responsive spacers acting to reduce the magnitude of said gaps when the temperature of said viscous fluid rises and to increase the magnitude of said gaps when the temperature of said viscous fluid drops.

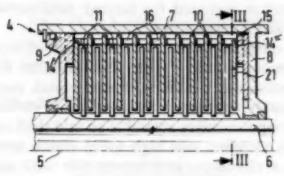


4,683,998

FLUID FRICTION CLUTCH, UTILIZING FLUID SHEAR FORCE BETWEEN CLUTCH PLATES AND CAMMING OF PLATES TOGETHER TO INCREASE FLUID SHEARS FORCES, ESPECIALLY FOR DIFFERENTIAL GEARS OF MOTOR VEHICLES

Saffet Cigdem, Munich; Rudiger Lichnofsky, Krailling, and Harry Martin, Neuried, all of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke AG, Fed. Rep. of Germany

PCT No. PCT/EP85/00097, § 371 Date Nov. 22, 1985, § 102(e) Date Nov. 22, 1985, PCT Pub. No. WO85/04226, PCT Pub. Date Sep. 26, 1985
PCT Filed Mar. 12, 1985, Ser. No. 799,115
Claims priority, application Fed. Rep. of Germany, Mar. 12, 1984, 3408977
Int. Cl.[4] F16D *35/00*; F16H *1/44*
U.S. Cl. 192—58 C 16 Claims



1. A fluid friction clutch, in particular for differential gears of motor vehicles, a closed toroidal chamber comprises a cylindrical inner body having an axis, a drum-shaped outer body arranged coaxially to said inner body and which can be rotated with respect to the inner body and with radial walls between the inner body and the outer body, the toroidal chamber containing plate sets engaging with one another, having ring-shaped clutch plates encompassing the inner body, said clutch plates being arranged alternately successively and at a distance to one another, while the clutch plates of a first plate set are in driving connection with the inner body and those of a second plate set are in driving connection with the outer body, the toroidal chamber having a sliding member affecting the plate spacing that can be axially moved and is developed as a rotating body, wherein the sliding member can be rotated with respect to the inner body and the outer body and comprising at least one ring-shaped adjusting disc which, on the one side thereof, is parallel to and at a distance opposite a clutch plate of one driving connection, and on the other side thereof, via at least one starting slope interacts with a second driving connection to move one set of plater closer to the other set of plates without touching, said toroidal chamber being fluid tight and able to contain a viscuous driving fluid for the fluid friction clutch and wherein the coming closer together of the two sets

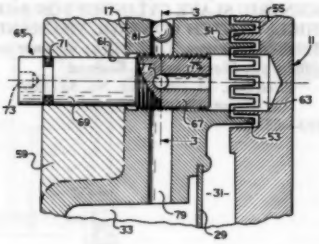
of plates caused an increased torque transfer between the two sets of plates by the viscous fluid medium.

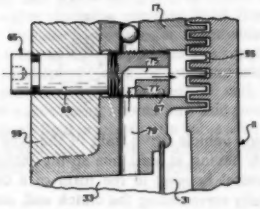
4,683,999

FLUID COUPLING DEVICE INCLUDING MANUAL ENGAGEMENT MEANS

Gerard M. Light, Marshall; LeRoy E. Rocco, and Stephen M. Clancey, both of Battle Creek, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Feb. 3, 1986, Ser. No. 825,507
Int. Cl.[4] F16D *35/00, 11/00*
U.S. Cl. 192—58 B **11 Claims**





1. A fluid coupling device of the type including a first rotatable coupling assembly comprising a housing member and a cover member cooperating to define a fluid chamber therebetween; means associated with said first coupling assembly and disposed to separate said fluid chamber into a fluid operating chamber and a fluid reservoir chamber; a second rotatable coupling member disposed in said fluid operating chamber and being rotatable relative to said first coupling assembly; said first coupling assembly and said second coupling member being operable to transmit torque therebetween in response to the presence of fluid in said operating chamber; fluid passage means disposed to communicate fluid between said fluid operating chamber and said fluid reservoir chamber; and primary control means operable to control the flow of fluid in said fluid passage means to provide operation of said fluid coupling device in one of an engaged mode and a disengaged mode, in response to changes in a predetermined condition, characterized by:

(a) manually operable control means operably associated with one of said fluid passage means and said primary control means and including a control member selectively movable between:

(i) a first position in which flow through said fluid passage means is controlled solely by said primary control means to provide normal operation of said fluid coupling device in one of said engaged mode and said disengaged mode as determined by said predetermined condition; and

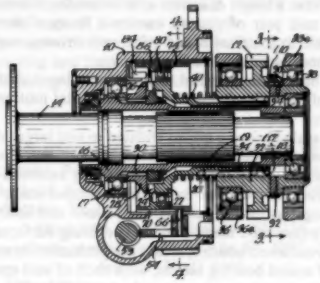
(ii) a second position insuring a net flow of fluid in said fluid passage means from said fluid reservoir chamber to said fluid operating chamber to provide operation of said fluid coupling device in said engaged mode, regardless of the status of said predetermined condition, and independent of the operation of said primary control means.

4,684,000

POWER TRANSMISSION DISCONNECT DEVICE WITH AN OPERATIONAL INTERLOCK

Neil L. Brown, Stillman Valley, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jul. 16, 1984, Ser. No. 631,982
Int. Cl.[4] F16D *11/00, 43/02*
U.S. Cl. 192—67 R **19 Claims**



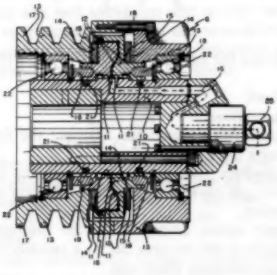
1. A power transmission disconnect device with an operational interlock comprising, a movable disconnect shaft, a driving clutch member mounted on said disconnect shaft, a driven clutch member connected to an output shaft, said clutch members being engageable to transmit power to the output shaft, means for moving said disconnect shaft to either engage or disengage said clutch members, and means to prevent disengagement of the clutch members above a predetermined speed of the driving clutch member and prevent engagement of the disengaged clutch members above a predetermined speed of the driving clutch member.

4,684,001

CLUTCHING APPARATUS AND METHOD OF CLUTCHING

Erland F. Carlson, 6045 N. Broadway, Wichita, Kans. 67219

Continuation-in-part of Ser. No. 472,095, Mar. 4, 1983, abandoned. This application Jun. 24, 1985, Ser. No. 747,770
Int. Cl.[4] F16D *13/40, 25/063*
U.S. Cl. 192—70 **13 Claims**



1. A pneumatic clutch comprising a clutch input shaft having a structure defining a pneumatic conduit;

a pair of pistons having opposed faces and drivably connected with said clutch input shaft and axially movable along and with respect to said clutch input shaft;

a totally enclosed housing means rotatably carried and supported by said clutch input shaft;

said pair of pistons making a driving connection with said totally enclosed housing means when air is directed under pressure through said pneumatic conduit to said opposed faces for effectively moving said pair of pistons axially to seize said totally enclosed housing means while said totally enclosed housing means prevents the transfer of any matter from within any internal cavity of the pneumatic clutch to the atmosphere simultaneously with preventing any matter including outside contaminants from entering any internal cavity of the pneumatic clutch;

said totally enclosed housing means has two driving surfaces; and

a structure defining a pair of internal tapering surfaces which taper from a larger diameter area to smaller diameter area;

each of said pair of pistons carries a friction shoe means operable to mate with and seize said driving surfaces of said totally enclosed housing means;

a spring bias means secured to said clutch input shaft and to each of the pair of pistons to oppose axial motion of said pistons;

a pair of sealed bearing means situated in said larger diameter area and between the clutch input shaft and the totally enclosed housing in order for the totally enclosed housing to be rotatably carried by the clutch input shaft;

said spring bias means, said pair of pistons and their respective friction shoe means, and said driving surfaces of said totally enclosed housing means are positioned between the pair of sealed bearing means, with each of said spring bias means being situated between the tapering surfaces of said totally enclosed housing and said clutch input shaft.

4,684,002

DEVICE FOR ADJUSTING A CLEARANCE OF A TWIN CLUTCH

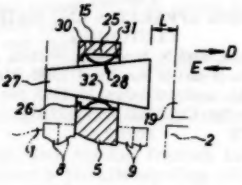
Hiroshi Takeuchi, Osaka, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Filed Oct. 28, 1985, Ser. No. 791,825

Claims priority, application Japan, Oct. 31, 1984, 59-166352[U]

Int. Cl.[4] F16D *13/54*

U.S. Cl. 192—70.25 **5 Claims**



1. A device for adjusting a clearance of a twin clutch comprising:

a flywheel;

a pressure plate;

two clutch discs interposed between the flywheel and the pressure plate;

an intemediate plate disposed between the clutch discs;

a stopper pin parallel to a clutch engaging and disengaging direction;

a stopper spring associated to the intermediate plate for connecting the stopper pin to a radially outer portion of the intermediate plate; and

a support member opposed to the flywheel with the stopper pin therebetween;

said stopper spring being so adapted that it allows a movement of the stopper pin toward the support member relatively to the intermediate plate, and prevents a movement of the stopper pin in the opposite direction relatively to the intermediate plate; said stopper spring being of cylindrical shape and having both end of a large diameter and an axially middle portion of a small diameter which is provided with circumferentially spaced slits, said stopper pin having and outer peripheral surface of a tapered shape, with its diameter becoming smaller toward an end at the flywheel side, both ends of the stopper spring being fixedly fitted into a hole at the outer peripheral portion of the intermediate plate, and said middle portion being elastically pressed onto the outer periphery of the stopper pin.

4,684,003

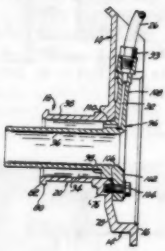
CONCENTRIC SLAVE CYLINDER FOR MOTOR VEHICLE CLUTCH CONTROL MECHANISM

Keith V. Leigh-Monstevens, Troy, Mich., assignor to Automotive Products plc, Warwickshire, England

Filed Sep. 30, 1983, Ser. No. 537,869

Int. Cl.[4] F16D *19/00*

U.S. Cl. 192—85 CA **1 Claim**



1. In a motor vehicle drive train of the type comprising a friction clutch having at least one spring biased release element, a structural housing in the form of a casting at least partially radially surrounding the clutch and, concentric with said housing, a driveshaft connecting the output of the clutch to the input of a gearbox; an hydraulic clutch actuator in the form of a slave cylinder comprising radially spaced inner and outer tubular elements together defining a chamber which is open in the direction of the clutch release element and substantially closed at the opposite end, a piston element slidably disposed between and in contact with both of said inner and outer tubular elements, a bearing retainer element in abutting contact with said piston to be axially driven therewith, a rotary throw-out bearing held by said retainer element and contacting said release element to operate same when said piston is displaced within said chamber, said chamber, said piston, said retainer means and said bearing all being concentric with said shaft and mounted around said shaft, the housing and at least the outer tubular element of said cylinder being cast as an integral unitary element, said inner tubular member formed of a separate element having a flange for attaching to said outer tubular member, said flange being formed with a hydraulic fluid passage therethrough for supplying fluid to said chamber to actuate said piston.

4,684,004

METHOD AND APPARATUS FOR CONTROLLING HYDRAULIC VEHICLE TRANSMISSION

Robert A. Stark, Gurnee, Ill., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Feb. 27, 1986, Ser. No. 833,189

Int. Cl.[4] F16D *25/11*

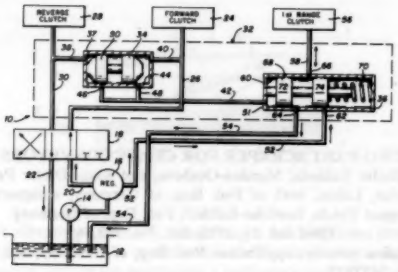
U.S. Cl. 192—87.13 **8 Claims**

1. Improved hydraulic control means for a vehicle transmission including a speed clutch and direction clutches, a hydraulic fluid reservoir, a hydraulic pump connected to the reser-

voir, a pressure regulator connected to the pump, and manually operable selector valve means connected to the regulator and with the direction clutches for directing hydraulic fluid to said speed clutch and direction clutches

in accordance with the direction and speed desired for the vehicle, the improvement comprising:

sequence valve means connected to said selector valve means and connected with said clutches, said sequence valve means including a shuttle valve receiving hydraulic fluid from the selector valve means and a spool valve connected with said shuttle valve, with said reservoir,



and with said speed clutch, said shuttle valve connected between said spool valve and direction clutches, said spool valve dumping pressure fluid from said speed clutch into the reservoir for inactivating said speed clutch when in a bleed position and supplying pressure fluid to said speed clutch for actuating said speed clutch when moved to a pressure position; and,

said spool valve being moved into said pressure position by pressure fluid in said shuttle valve after one direction clutch is activated and biased into said bleed position by a resilient member located therein.

4,684,005

SLIDING SLEEVE FOR CLUTCHES OF AUTOMOTIVE VEHICLES

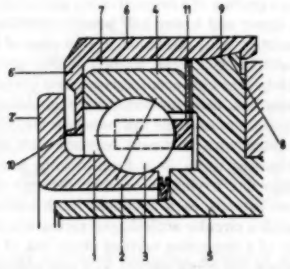
Gerhard Mittendorf, Niederwerrn, Fed. Rep. of Germany, assignor to Fag Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 865,157

Claims priority, application Fed. Rep. of Germany, May 22, 1985, 3518350

Int. Cl.⁴ F16D *19/00*

U.S. Cl. 192—98 **13 Claims**



1. A sliding sleeve for placement over an anti-friction bearing, wherein the bearing comprises:

a radially outward outer ring, a radially inward inner ring which is radially inward of the outer ring, a plurality of rolling elements disposed between the inner and outer rings for rolling therebetween, the inner ring having one axial end at which is disposed a radially outwardly directed, annular flange which projects radially outwardly toward and is axially outward of the corresponding one axial end of the outer ring;

a sliding sleeve cover ring for being disposed around the outer ring, the cover ring comprising an axially extending portion which extends past said outer ring to define a substantial clearance space between the axially extending portion and the outer ring, said clearance space being radially outward of the outer ring and extending for the axial length thereof;

said cover ring also wrapping around the outer ring and comprising a radially inwardly directed arm which extends radially inwardly and past the one axial end of the outer ring and partially past the radially outwardly directed flange of the inner ring; and

sealing means between the radially directed flange of the inner ring and the radially directed arm of the cover ring for forming a liquid seal therebetween.

4,684,006

FRICTION CLUTCH DRIVEN PLATE

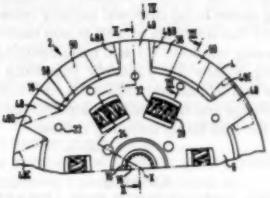
Pietro Caracini, Passo Di Treia, and Luigi Cucinotta, Castelbellino, both of Italy, assignors to Automotive Products plc, Warwickshire, England

Filed Apr. 14, 1986, Ser. No. 851,154

Claims priority, application Italy, Apr. 12, 1985, 20317 A/85

Int. Cl.⁴ F16D *3/66*

U.S. Cl. 192—106.2 **16 Claims**



1. A friction clutch driven plate comprising first and second carrier plates fast in rotation one with the other and being rotatable about a central axis, the first carrier plate having at its circumference outwardly extending spokes and the second carrier plate having at its circumference outwardly extending spokes, said spokes supporting annularly disposed friction material in the form of an intergral annulus providing first and second oppositely facing friction faces, each of said friction faces being formed with recesses therein, said spokes on said first carrier plate being disposed in aforesiad recesses in said first friction face and said spokes on said second carrier plate being disposed in aforesaid recesses in said second friction face, and each said spoke being disposed in a respective said recess in a said face which is prominent of the spoke.

4,684,007

CLUTCH PLATE

Edmund Maucher, Wooster, Ohio, assignor to Luk Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany

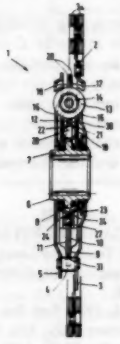
Filed Apr. 18, 1983, Ser. No. 485,615

Int. Cl.⁴ F16D *3/14, 3/66*

U.S. Cl. 192—106.2 **33 Claims**

1. A clutch plate, particularly for use in friction clutches of automotive vehicles, comprising a first unit including spaced-apart coaxial rigidly interconnected first and second disc members and friction linings provided on one of said disc members; a second unit including a hub having an external flange disposed between said disc members, said flange having at least one recess; a third unit including first and second metallic

intermediate discs flanking said flange, disposed between said disc members non-rotatably connected to one another and having first portions extending radially outwardly well beyond said flange, the first portion of one of said intermediate discs abutting aginst the first portion of the other of said intermediate discs, said units being arranged to perform limited angular movements with reference to each other and at least one of said intermediate discs having at least one second portion extending with angular play into said recess to thus determine the extent of angular movability of said second and third units



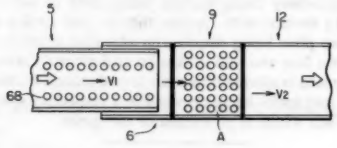
relative to each other; main damping means for yieldably opposing the angular movements of said first and third units with reference to one another, at least the major part of said main damping means being disposed radially outwardly of said flange, and said disc members as well as said intermediate discs having registering windows for said main damping means; and idling damping means for yieldably opposiing the angular movements of said second and third units with reference to one another, said flange and said intermediate discs having registering openings for said idling damping means.

4,684,008

APPARATUS AND METHOD FOR ARRAYING AND CONVEYING ROWS OF PRODUCTS

Torahiko Hayashi, Utsunomiya, and Etsuo Ota, Kanuma, both of Japan, assignors to Rheon Automatic Machinery Co., Ltd., Japan

Filed Aug. 20, 1985, Ser. No. 767,496
Int. Cl.[4] B65G *47/26*
U.S. Cl. 198—436 **8 Claims**



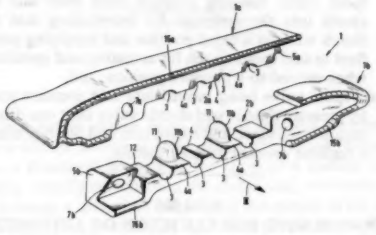
1. An apparatus for arraying and conveying rows of products comprising a first conveyor successively feeding at least one row of products in a longitudinal direction, first means for reciprocally extending and retracting a delivery end portion of said first conveyor in the longitudinal direction, a second conveyor disposed beneath and opposite to the delivery end portion of said first conveyor for receiving thereon said at least one row of products transferred by said reciprocating delivery end portion of said first conveyor, second means for driving said second conveyor intermittently in a transverse direction such that said second conveyor can receive at least a second row of products thereon from said reciprocating delivery end portion of said first conveyor, thereby multiplying the number of rows of products arrayed on said second conveyor with respect to the number of rows fed by said first conveyor, a third conveyor disposed downstream of a delivery end portion of the second conveyor for receiving the multiplied rows of arrayed products from said second conveyor, and third mean for driving said third conveyor.

4,684,009

TWO-PART SCRAPER FOR CHAIN CONVEYORS

Friedhelm Rehbein, Menden-Oesbern, and Klaus-Dieter Peitzmeier, Löhne, both of Fed. Rep. of Germany, assignors to August Thiele, Iserlohn-Kalthof, Fed. Rep. of Germany

Filed Jul. 24, 1985, Ser. No. 758,545
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1984, 3427917
Int. Cl.[4] B65G *19/24*
U.S. Cl. 198—731 **5 Claims**



1. A two-part scraper for a chain conveyor, particularly a double chain conveyor, comprising an upper scraper half and a lower scraper half separated from each other by a separating plane and forming therebetween a chain bed extending through said plane, said upper and lower half forming with each other in said chain bed a plurality of pair of parallel channels positioned one beside the other and said channels in each pair are separated from each other by webs, said channels each receiving a portion of a respective horizontal chain link of a chain, said upper and lower half being connected to each other by connecting bolts positioned at two sides of said chain bed, at least some of said webs, formed on one of said halves between two adjacent channels receiving two portions of the horizontal chain link, being provided with an abutment tooth extended outwardly of said one half, whereas the other of said halves is provided with abutment recesses each engaging a respective abutment tooth in a form-locking fashion, each horizontal chain link having an opening through which said abutment tooth extends, each abutment tooth having a backside formed with a circular arch-shaped recess which receives a curved stem of a respective vertical chain link of the chain, said vertical chain link being tracked with said horizontal chain link, each abutment tooth further having an end face which is inclined forwardly in a feeding direction of the chain while each abutment recess in the other of said halves has a forwardly inclined surface immediately abutting against said inclined end face, each abutment tooth and each abutment recess having rounded-off engagement edges.

4,684,010

VIBRATING CONVEYOR WITH VIBRATION ISOLATION

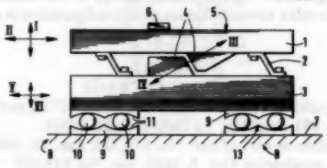
Odo Hütter, Kirchheim/T., and Rainer Jung, Eberdingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 580,541, Feb. 15, 1984, abandoned. This application Jan. 3, 1986, Ser. No. 815,786

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1983, 3305166

Int. Cl.[4] B65G *27/08*

U.S. Cl. 198—765 **7 Claims**



1. A vibrating conveyor, comprising a working mass driveable in vibrations in a predetermined direction and having a conveying surface for supporting a workpiece to be conveyed over a conveying path; drive means arranged to drive said working mass in vibrations for vibrating said working mass and said counter mass at least in a horizontal direction; a counter mass serving as a base body; a support surface on which said counter is mounted; connecting means for connecting said working mass with said colunter mass; and means provided between said counter mass and said support surface for vibration isolation and/or damping of horizontal vibratory forces, said means for vibration isolation and/or damping including a plurality of horizontally spaced units each having two oppositely facing vertically spaced bearing surfaces and a roller element positioned to freely rotate therebetween, said bearing surfaces each being formed symmetrically about a vertical plane which extends perpendicular to the conveying path, at least one of said bearing surfaces being concave.

4,684,011

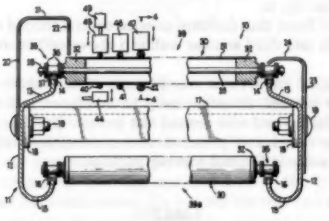
CONVEYOR ROLLERS WITH TRACTION O-RINGS AND CONVEYOR INCLUDING SAME

Thomas C. Schneider, Oak Forrest, Ill., assignor to Velten & Pulver, Inc., Chicago Ridge, Ill.

Filed Oct. 22, 1985, Ser. No. 790,141

Int. Cl.[4] B65G *17/24*

U.S. Cl. 198—779 **12 Claims**



1. In a roller conveyor including a pair of spaced-apart endless conveyor chains movable along parallel conveyor paths, and a plurality of rollers having axes extending perpendicular to the chains and spaced apart longitudinally thereof with each roller interconnecting said chains and being freely rotatable about its axis, apparatus for controlling the effective conveyor speed without changing the speed of movement of the conveyor chains comprising: a plurality of resilient rings, each of said resilient rings extending circumferentially around an associated one of said rollers coaxially therewith and in firm engagement therewith in positions spaced apart laterally of the conveyor, and a plurality of traction means selectively frictionally engageable with said rings, each of said traction means being positioned for engagement with only a single ring on any one roller to cause the roller associated with each said ring to rotate about its axis in response to movement of the conveyor chains along the conveyor paths.

4,684,012

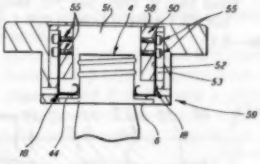
BLOW MOLDING PALLET ASSEMBLY

Frederick J. Feddersen, Londonderry, N.H., assignor to Fedders Machine and Tools Co., Inc., Londonderry, N.H.

Continuation of Ser. No. 628,449, Jul. 6, 1984, abandoned. This application Jun. 23, 1986, Ser. No. 879,535

Int. Cl.[4] B65G *47/86*

U.S. Cl. 198—803.01 **9 Claims**



1. A pallet assembly for conveying substantially horizontally a plurality of workpieces each having a circular cross-section from one location through a manufacturing operation to another location comprising the assembly of:

an elongate pallet shuttle constituting a base on which the other members of the assembly are mounted;

a plurality of workpiece supporting and locating assemblies supported longitudinally on said shuttle, each of said assemblies further comprising:

a workpiece support and locating means having resilient means comprising a plurality of spaced apart spring members, each said spring member having a generally vertically extending elongate planar spring portion and a looped end for engaging said workpiece, an area of each said portion, adjacent one end thereof, being secured to said supporting means, said looped end extending from the other end of said portion to engage and resiliently support a workpiece against a stop ring supported on said shuttle to receive, vertically locate and center a workpiece with reference to said shuttle, said ring having an aperture therethrough and a substantially circular locating surface for receiving and locating a matching surface on said workpiece.

4,684,013

AUTOMATIC LOADING TRAY FOR THIN-WALLED PLASTIC FLOWER POTS

Paul J. Jacobs, Moundsview, Minn., assignor to T. O. Plastics, Inc., Minneapolis, Minn.

Continuation of Ser. No. 649,953, Sep. 11, 1984, abandoned, which is a continuation-in-part of Ser. No. 538,514, Oct. 3, 1983, abandoned. This application Apr. 24, 1986, Ser. No. 858,565

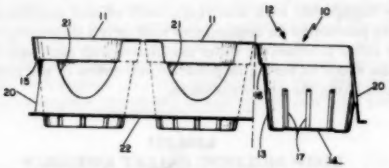
Int. Cl.[4] B65D *85/50, 1/34*

U.S. Cl. 206—423 **7 Claims**

1. A loading tray for a plurality of stacks of upside-down, empty, thin-walled, plastic flower pots arranged in preset spaced rows and columns, said tray comprising:

an imperforate, thin and somwhat resilient sheet of relatively stiff plastic formed into a plurality of cavities spaced in rows and columns the same as said stacks of pots, each of said cavities having an open top and inwardly downward tapering inner wall means for grasping a single flower pot

from said stacks of pots when the tray is placed upside down over said stacks of upside-down flower pots and



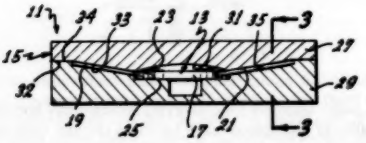
pressed onto the stacks of pots and then lifted off the stacks.

4,684,014

IOL LOOP RETENTION PACKAGE AND METHOD

James M. Davenport, Laguna Niguel, Calif., assignor to American Hospital Supply Corp., Evanston, Ill.

Filed Dec. 9, 1985, Ser. No. 806,666
Int. Cl.[4] A45C *11/04*; A61F *2/16*
U.S. Cl. 206—5.1 **16 Claims**



1. A lens case, comprising:

a pair of first and second case sections having respective ones of a pair of first and second faces, which case sections are adapted to be placed together with the first and second faces confronting to define an optic cavity between the case sections in which to contain an intraocular lens having a fixation member mounted on the optic of the lens;

which first and second case sections are adapted to be used as a packaging container for the lens;

the first case section defining at least a first portion of the optic cavity in the first face in which to place the optic and a fixation member cavity in the first face in which to place the fixation member;

the first portion of the optic cavity having a size and shape closely conforming to the size and shape of a first portion of the optic;

the fixation member cavity extending from the first portion of the optic cavity along a curved path closely conforming to the desired fixation member configuration;

which fixation member cavity defines a thin, elongated groove in which to insert a fixation member in the form of a thin filament that extends from the optic to a terminal end of the fixation member spaced apart from the optic, and

which second case section is adapted to retain the optic and the fixation member within the optic and fixation member cavities securely when the case sections are placed together to inhibit relaxation of the fixation member from the desired fixation member configuration.

7. A method comprising:

providing an intracular lens having an optic and at least one filamentary fixation member attached to the optic that extends from the optic along a curved path to a distal end of the fixation member in a desired member configuration, which fixation member is composed of a material which tends to relax toward another configuration which is different from said desired fixation member configuration;

using a packaging container in the form of an openable lens case having a pair of case sections defining an optic cavity in which to contain the optic of the lens and a fixation member cavity in which to contain the fixation member, which fixation member cavity is in the form of a thin elongated groove that extends from a first portion of the optic cavity along a curved path closely conforming to the desired fixation member configuration;

placing the optic in the optic cavity and the fixation member in the fixation member cavity; and

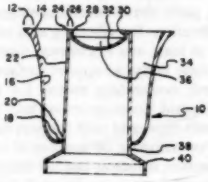
closing the lens case to thereby retain the intraocular lens between the case sections securely with the fixation member held in the desired fixation member configuration within the fixation member cavity, to thereby package the intraocular lens in a lens case which retains the fixation member in substantially said desired fixation member configuration whereby the tendency of the fixation member to relax toward said another configuration is reduced.

4,684,015

VENDING PACKAGE

Edward Vezirian, 110 Firwood, Irvine, Calif. 92714, and Earle L. Hinton, 851 Brighton, La Habra, Calif. 90631

Continuation-in-part of Ser. No. 876,725, Jun. 20, 1986. This application Oct. 3, 1986, Ser. No. 915,002
Int. Cl.[4] A45C *11/00*
U.S. Cl. 206—19 **4 Claims**



1. A dual compartment disposable individual serving comestibles package for sanitarily purveying a pair of separated and dissimilar portions comprising:

an outer perimetric first flat annular lip,

an outer first wall extending downward from an inner edge of said first flat annular lip to an annular cusp,

an intermediate second annular wall extending upward from an inner side of said annular cusp to a plane containing said first annular lip, thus forming an open annular first chamber between said outer first annular wall and said intermediate second annular wall,

a second flat annular lip inwardly extending within said plane from said second annular wall, to

a central third annular wall, said third annular wall extending downward from an inner edge of said second flat annular lip, to

a central floor, thus forming an open central second chamber within said third annular wall and above said central floor, and

a separated impervious membranous closure sheet adapted to be bonded simultaneously to co-planer said first flat annular lip and said second flat annular lip, thus to separately retain and preserve said comestibles within said disposable individual serving package.

4,684,016

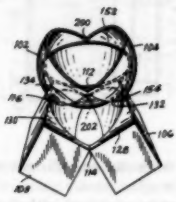
DISPLAY CASE FOR FRAGRANCE BOTTLES, JEWELRY, OR THE LIKE

Philip P. Simkins, New York, N.Y., assignor to Steven W. Hewitt, Mt. Kisco, N.Y., a part interest

Filed Jun. 10, 1986, Ser. No. 872,620
Int. Cl.[4] B65D *6/02*
U.S. Cl. 206—45.13 **9 Claims**

1. A container capable of being moved from a closed position to an open position, comprising:

an enclosure member comprising a first section, a second section, a third section and a fourth section, the first, second, third and fourth sections being movable with respect to each other from an open position to a closed position and, in a closed position, defining a first cavity, with the first and second sections being hingedly connected at a first set of hinge points and the third and fourth sections being hingedly connected at a second set of hinge points, and with the first and fourth sections being hingedly connected at a position remote from the first and



second sets of hinge points, and the second and third sections being hingedly connected at a position remote from the first and second sets of hinge points; and

a tray member disposed in the first cavity when the first, second, third and fourth sections are in a closed position, the tray member being rotatably connected to the first set of hinge points and being arranged and constructed so that when the first, second, third and fourth sections are moved to an open position the tray member is exposed for access.

4,684,017

COMPACT CASE

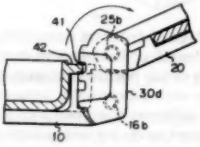
Nobuhisa Watanabe, Tokyo; Hisao Iwamoto; Toshihiro Nasuno, both of Odawara, and Yoshio Sakamaki, Tokyo, all of Japan, assignors to Kanebo Limited and Yoshida Industry Co., Limited, both of Tokyo, Japan

Filed Jun. 10, 1985, Ser. No. 742,925

Claims priority, application Japan, Jun. 11, 1984, 59-85518[U]

Int. Cl.[4] B65D *85/68*

U.S. Cl. 206—235 **3 Claims**



1. A compact case comprising a case proper and a lid member which are connected to each other through a hinge so that the case is freely opened and closed, wherein concave notches communicating with each other are formed in rear end portions of the case proper and lid member, the hinge is contained in the notches so that the rear end face of the hinge is not projected outward rearwardly beyond the rear end portions of the case and the lid member when the case and lid member are closed, and the upper portion of the hinge is rotatably connected to the lid member through a first shaft and the lower portion of the hinge is rotatably connected to the case proper through a second shaft, wherein the hinge has a groove, the groove is engaged with an anchoring projection formed on the case proper, and said groove and projection cooperating to comprise means for temporarily anchoring the lid member on said anchoring projection when the lid member is rotated around the first shaft during opening of the lid member.

4,684,018

THERMOMETER SHEATH

Erik Järund, Fjällbacka, Sweden, assignor to Develio AB, Fjällbacka, Sweden

Continuation of Ser. No. 598,843, Apr. 10, 1984, abandoned.

This application Apr. 30, 1986, Ser. No. 870,649

Claims priority, application Sweden, Apr. 15, 1983, 8302099

Int. Cl.[4] B65D *85/38*

U.S. Cl. 206—306 **4 Claims**

1. A cartridge like multiple pack of thermometer sheaths comprising a plurality of such sheaths having:

a continuous support foil of paper with a top edge and a bottom edge,

a first thin plastic foil on said support having a top edge lying adjacent and substantially parallel to the top edge of said support and a plurality of toe portions extending towards said bottom edge,

a second thin plastic foil overlying said first plastic foil, said second foil having a top edge displaced from and parallel to the top edge of said first foil and a plurality of toe portions extending toward the bottom edge of said support and substantially overlying toe portions of said first foil,

a plurality of heat-seal lines transverse to the top edges of foils and support which define sides between adjoining thermometer sheaths, which also extend around and join the toe portions of said toe foils, which heat seals are effective to form severable lines between adjoining sheaths and which also serve to adhere said foils to the support foil along the line defining the side edges and toe portions of the thermometer sheaths,

the displacement of the top edge of said second foil relative to the top edge of said first foil being sufficient to define an opening between said foils for insertion of a thermometer, said displacement further leaving a portion of top edge of the first plastic foil extending beyond the top edge of said second foil, thereby forming a flap to facilitate insertion of said thermometer, and

a plastic stiffening strip between said first and second foils below the top edge of said second foil and running substantially parallel to the top edges of said plastic foils and support, said strip being bendable and having the ability to keep said first and second foils separated, a portion of said strip extending above the top edge of said second foil and below the top edge of said first foil and a portion of said strip extending below said top edge of said second foil, said strip being sealed in place between said first and second foils by the sealing lines which seal the entire strip to said first foil and the entire portion of the strip extending below the top edge of said second foil to the second foil, said strip being effective to facilitate insertion of a thermometer into a sheath within said cartridge-like pack.

4,684,019

DISKETTE STORAGE CONTAINER

Robert A. Egly, 31 Belcourt South, Newport Beach, Calif. 92660

Filed Oct. 15, 1985, Ser. No. 787,312

Int. Cl.[4] B65D *85/57*

U.S. Cl. 206—309 **10 Claims**

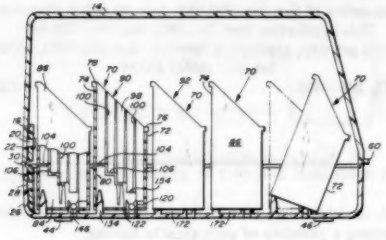
1. A container for containing magnetic media comprising:

a base member;

a cover adapted for overlying placement on said base member;

a plurality of individualized containers having pivotal attachment means for interconnecting said individualized containers to said base member in a removable manner

formed by a spindle in the base of each of said individualized containers; and,



upstanding pincer means extending from said base member to receive said spindle for holding said spindle in the jaws of said pincer means.

4,684,020

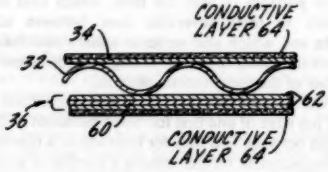
CONDUCTIVE CONTAINER

Ralph C. Ohlbach, Deerefield, Ill., assignor to Conductive Container, Inc., Northbrook, Ill.

Continuation-in-part of Ser. No. 778,398, Sep. 20, 1985, abandoned. This application Mar. 10, 1986, Ser. No. 838,292

Int. Cl.[4] B65D *73/02*

U.S. Cl. 206—328 **12 Claims**



1. A six-walled paperboard container for protecting electronic goods contained therein from damage due to electrostatic discharge, due to electromagnetic field interference or due to interference from a radio frequency field, constructed from a flat paperboard blank, said paperboard blank on its opposed planar surfaces presenting continuous layers of conductive carbon black and of which at least one carbon black layer is in effective contact with a metallic foil therebeneath and united to the blank so that any electric charge on the metal foil will drain to said one carbon black layer, said blank being so folded as to present five walls and a closure wall joined thereto collectively presenting said six-walled container defining a cavity for the electronic goods, the closure wall when closed having at least one flap with its carbon black layer in contact with the carbon black layer on an interior surface of the container so that any current induced by either field on the foil will be conducted to the exterior of the container via said flap contact and from thence may be drained to ground.

4,684,021

BOTTOM LOADING WAFER CARRIER BOX

Tracy J. Niebeling, Minneapolis, and Walter I. Bieger, St. Paul, both of Minn., assignors to Fluoroware, Inc., Chaska, Minn.

Filed Jun. 23, 1986, Ser. No. 877,336

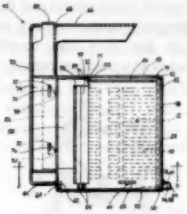
Int. Cl.[4] B65D *85/30, 81/00, 57/00*

U.S. Cl. 206—334 **25 Claims**

1. A bottom loading wafer carrier box with a housing defining a cavity which appropriately may have a still and particulate free environment for a wafer carrier handling silicon wafers which are used in the manufacture of semicondutors, comprising:

(a) an open bottom in the housing suitable for receiving the wafer carrier into the cavity;

(b) a releaseable door for closing the open bottom and sealing the cavity from the ambient environment about the housing of the box;



(c) an operable carrier catch within the housing for retaining the wafer carrier within the cavity of the housing; and

(d) control means operably connected to the carrier catch for acutating engagement of the catch with the carrier.

4,684,022

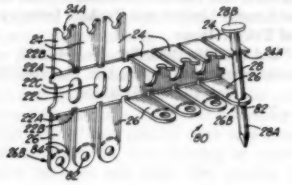
FASTENER STRIP

Frank R. Potucek, Des Plaines, Ill., assignor to Duo-Fast Corporation, Franklin Park, Ill.

Continuation of Ser. No. 845,076, Oct. 25, 1977, abandoned, which is a division of Ser. No. 614,759, Sep. 18, 1975, which is a division of Ser. No. 387,443, Aug. 10, 1973, Pat. No. 3,915,367. This application Feb. 23, 1979, Ser. No. 14,425

Int. Cl.[4] B65D *85/24*

U.S. Cl. 206—347 **19 Claims**



1. An assemblage of fasteners comprising

an elongated length of flexible web material,

a pair of rows of tab portions projecting from the opposite edges of the web substantially transverse thereto, the tab portions in different rows being of different lengths and having fastener receiving means disposed at the outer free ends of the tab portions,

and a plurality of headed fasteners each having a head portion and a shank portion, each fastener having its shank portion disposed in the fastener receiving means on one tab portion in each of the two rows.

4,684,023

CONTENT-IDENTIFYING CARTON STRUCTURE

Jeffery J. Cortopassi, Costa Mesa, Calif., assignor to Taco Bell, Irvine, Calif.

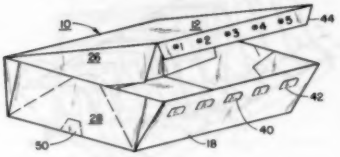
Filed Jun. 25, 1986, Ser. No. 878,316

Int. Cl.[4] B65D *5/22*

U.S. Cl. 206—459 **8 Claims**

1. A multi-purpose carton incorporating a content-identifying arrangement, said carton comprising integral front panel, rear panel, end panel and side panel structures hingedly joined along a plurality of fold lines to provide a foldable, parallelepiped carton configuration, a flap hingedly joined to an outer

edge of only one of said panels, and adapted to underlie a second of said panels in surface contact therewith and being pivotal away from said second panel, about said outer edge, in the erected condition of said carton and forming a carton closure, said flap having carton content-identifying legends imprinted on the surface facing said second panel; a plurality of tuck-tabs in a linearly spaced array cut into said second panel so as to be joined thereto along a single hinge line and being



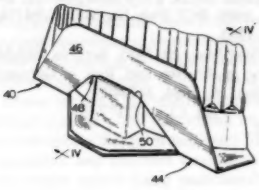
arranged to overlie said flap coextensive with said flap, said underlying flap terminating substantially in alignment with the hinge line of said tuck-tabs, each of said tuck-tabs being selectively depressable to engage rearwardly of said flap in coextensive surface contact therewith to provide visual access to printing on said flap in registry with the location of said depressed tuck-tab indicative of the contents in said carton without the necessity of opening said carton.

4,684,024

COVER FOR BAKED GOODS

Sajjad Ebrahim, Willowdale, and Donald K. Hexamer, Brantford, both of Canada, assignors to Par-Pak Limited, Richmond Hill, Canada

Filed Feb. 11, 1986, Ser. No. 828,252
Claims priority, application Canada, Dec. 19, 1985, 498122
Int. Cl.[4] B65D *45/04*
U.S. Cl. 206—464 **6 Claims**



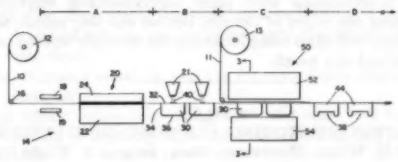
1. A package for bakery items comprising:
thin planar base means of expanded polystyrene to support bakery items thereon,
removable cover means comprising transparent thermoplastic material and having a top wall and side walls depending peripherally from the top wall,
the side walls rising upwardly toward the top wall from a bottom edge portion of the cover means substantially lying in the plane of the base means and resting on the periphery of the base means,
the bottom edge portion comprising a flange-like border member which extends outwardly to where the cover means terminates as a peripheral side edge of the border member,
the side walls having a plurality of circumferentially spaced integral catch means projecting outwardly from the side walls, each catch means rising upwardly from the bottom edge portion to an upwardly directed catch surface at a height above the border member,
the border member encircling the side walls and their catch means outwardly thereof continuously about the entire perimeter of the cover means so as to space upwardly rising portions of the side walls and their catch means from the peripheral side edge,
the base means having a plurality of circumferentially spaced, outwardly-projecting hook-forming portions which extend outwardly beyond the peripheral side edge of the cover means, one hook-forming portion below each catch means,
a U-shaped cut line through each hook-forming portion located marginally outward of the peripheral side edge and defining between the cut line and an outer edge of the base means an outer hook member with an inwardly facing blight bordering on the cut line,
a first straight score line on each hook-forming portion located marginally outward of the peripheral side edge and extending from a first end of said cut line to the edge of the base means,
a second straight score line on each hook-forming portion located marginally outward of the peripheral side edge and extending from the other, second end of said cut line to the edge of the base means,
the second score line lying along an extension of the first score line,
the peripheral side edge of the cover means over the hook-forming portion being located substantially coincident with each of the first score line, the cut line and the second score line marginally inwardly thereof,
each hook member bendable with respect of the remainder of the base means about the first and second score lines to pivot the hook member upwardly toward the cover means to a position with the hook member overlying a rerespective catch means with the blight of the hook member engaged on the upwardly directed catch surface of the catch means to securely couple the cover means to the base means, base means,
the base means providing a continuous, planar support surface underlying the entirety of the cover means within an area defined by the peripheral side edge, and
said blight including a wide, flat central section parallel to said first score line, the upwardly directed catch surface having a width marginally less than that of said central section with the upwardly directed catch surface disposed parallel to said central section for engagement by the central section over substantially the entire width of the central section.

4,684,025

SHAPED THERMOFORMED FLEXIBLE FILM CONTAINER FOR GRANULAR PRODUCTS AND METHOD AND APPARATUS FOR MAKING THE SAME

Donald S. Copland, Lebanon; Larry D. Halstead, Hamilton, and Lawrence E. O'Brien, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 30, 1986, Ser. No. 823,917
Int. Cl.[4] B65B *1/24*
U.S. Cl. 206—484 **22 Claims**



1. A sealed, thermoformed container comprised of non-shape retaining flexible film, but exhibiting a preselected, substantially solid shape, said container having a granular product therein and being substantially free of gases, said container comprising:
(a) a lower cup defining a hollow cavity of preselected size and shape thermoformed from a non-shape retaining flexi-

ble film, said lower cup having an upper peripheral flange and a bottom wall, said bottom wall being provided with a concave impression also of preselected size and shape extending into said hollow cavity at a preselected location;

(b) a predetermined quantity of said granular product contained within said hollow cavity and having a top surface in the form of a composite of the uppermost granules of said product; and

(c) a substantially planar top lid having a distal edge and a bottom surface, said distal edge being continuously and releasably sealed about said upper peripheral flange of said lower cup, said bottom surface of said substantially planar lid being in continuous contacting relation with said top surface of said predetermined quantity of granular product, whereby atmospheric pressure acting upon the exterior surfaces of said sealed, substantially gas-free container maintains said container in said preselected, substantially solid shape until said container is opened.

4,684,026

INFLATABLE BAGS

Seiji Takeuchi, Burlington, and Byron H. Anger, Hamilton, both of Canada, assignors to Don Fell Limited & Donfab Investments, Inc., Hamilton, Canada

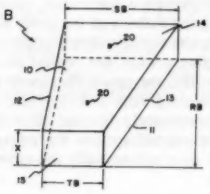
Continuation of Ser. No. 799,324, Nov. 18, 1985. This application Sep. 24, 1986, Ser. No. 911,143

Claims priority, application Canada, Oct. 8, 1985, 492494

The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.

Int. Cl.[4] B65D *81/02*

U.S. Cl. 206—522 **1 Claim**



1. An inflatable bag of tough, flexible, liquid tight material, said bag having a shape defined by

(a) a pair of similar top and bottom panels defining planes parallel to each other, each said panel having tapering side edges and the shape of a truncated isosceles triangle,

(b) a pair of rectangular side panels similar to each other and interconnecting respective ones of said side edges,

(c) a rectangular outer panel interconnecting respective outer end edges of the top, bottom and side panels, said outer end edges being located at the outwardly tapered ends of said side panels, and

(d) a rectangular inner panel interconnecting respective inner end edges of the top, bottom and side panels, said inner end edges being located at the inwardly tapered ends of said side panels.

4,684,027

STATIONARY STORING AND DISPENSING SYSTEM

David M. Wright, Shrewsbury, Mass., assignor to Wright Line, Inc., Worcester, Mass.

Filed Sep. 25, 1986, Ser. No. 912,069

Int. Cl.[4] A47F *7/00*

U.S. Cl. 211—40 **12 Claims**

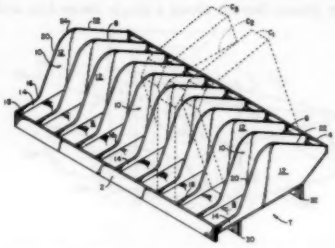
1. A stationary storing and dispensing system for square or rectangular objects comprising:

a tray having a front wall, a rear wall, and a bottom,

dividers projecting upwardly from the bottom of the tray to form a plurality of cells, each divider forming one side wall of a cell,

the side walls being spaced from the front wall and terminating at the rear wall to expose a forward portion of an object positioned on the bottom adjacent the front wall,

the bottom extending from the front wall to a location



spaced from the rear wall, the rear wall being higher than the front wall, and

an upwardly inclined ramp joining the bottom to the rear wall,

whereby an object manually displaced from a position on the bottom of the cell in a direction rearwardly and up the inclined ramp will slide back to the bottom when released.

4,684,028

ARRANGEMENT FOR RECORD FILING

Paul Reppel, Ölmühler Weg 5, 5883 Kierspe 3-Rönsahl, Fed. Rep. of Germany

PCT No. PCT/EP85/00137, § 371 Date Nov. 27, 1985, § 102(e) Date Nov. 27, 1985, PCT Pub. No. WO85/04374, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 29, 1985, Ser. No. 810,334

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1984, 3411543; Sep. 20, 1984, 3434485

Int. Cl.[4] A47F *7/00*

U.S. Cl. 211—51 **8 Claims**

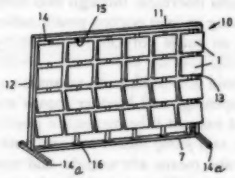
1. An arrangement for filing records in which a fastener, provided with a central bead and two flexible fastening prongs for passing through holes in the records, is removably secured in a slot on a fastener carrier said carrier having a generally planar surface for receiving the records and having peripheral edges, whereby a guide channel located within the slot and parallel to the longitudinal axis of the fastener receives the central bead of the fastener, said carrier further comprising a flexible flap formed from a portion of said generally planar surface is an edge of said flap being disposed adjacent to the guide channel and within said peripheral edges, thereby cooperating with said guide channel and allowing insertion and removal of said fastener from said carrier.

4,684,029

DISPLAY STAND

Roy Righini, 12 Tillock Street, Thornleigh 2120, New South Wales, Australia

Filed Nov. 1, 1985, Ser. No. 793,836
Int. Cl.[4] A47E *29/00*
U.S. Cl. 211—78 6 Claims



1. A display stand comprising a support frame having two parallel side members and two parallel end members defining a rectangular opening, first bearing means on one of the side members, second bearing means on the other side member with respective first and second bearing means aligned to mount shaft assemblies in parallel relationship in the frame opening, a number of individually manually rotatable parallel shaft assemblies mounted in the bearing means, each shaft assembly comprising a body of rectangular cross-section, a spigot extending from one end of the shaft assembly body and fixed thereto and inserted into one of the first bearing means, a socket in the other end of the shaft assembly body, a plunger including a shoulder intermediate it's ends, a compression spring housed in the socket engaging an end face of one end of the plunger housed in the socket, the other end of the plunger is housed in one of the second bearing means with the plunger shoulder biassed into engagement with the second bearing means by the compression spring, holders for sheet objects to be displayed, clamping means on each holder embracing a shaft assembly body whereby the holder can be positioned as required along the length of the shaft assembly body, the shaft assemblies being spaced apart and from the ends of the frame sufficiently allowing the shaft assemblies to be rotated without the holders on adjacent shafts contacting each other and the holders on the end shafts contacting the ends of the frame, and releasable positioning means locating the shaft assemblies in predetermined rotational positions, the positioning means comprising detent means between a flange around and fixed to spigot of each shaft assembly and the first bearing means associated therewith, the detent means being maintained in engagement by the action of the spring on the end face of the plunger of the shaft assembly and being releasable by manual rotation of the shaft assembly to overcome the detent engagement and cause axial movement of the shaft assembly body axially relative to the plunger with associated further compression of the compression spring.

4,684,030

DISPLAY RACK ASSEMBLY

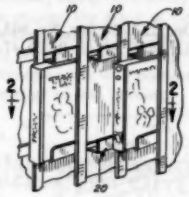
Richard M. Gurzynski, Riverside, Ill., assignor to Nieman Design Systems Inc., Mount Prospect, Ill.

Filed May 1, 1986, Ser. No. 858,026
Int. Cl.[4] A47F *5/08*
U.S. Cl. 211—88 23 Claims

1. A modular display rack assembly comprising:

a plurality of vertical panels, each said vertical panel comprising a rear wall, a side wall extending substantially perpendicularly from one vertical edge of said rear wall, a front wall extending from one vertical edge of said side wall substantially parallel to said rear wall, each said vertical panel having attachment means for fastening with an adjacent said vertical panel; and

a plurality of shelf brackets attachable to each said vertical panel, each said shelf bracket comprising a bottom wall with at least two support walls extending substantially



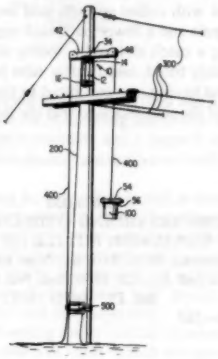
perpendicularly therefrom, at least one of said support walls attachable to said vertical panel.

4,684,031

MATERIAL HOISTING GIN

Frederick S. Bergman, #12685 - 82nd Avenue, Surrey, British Columbia, Canada (V3W 3G2), and Reginald P. Radelet, Maple Ridge, Canada, assignors to Frederick Sigurdur Bergman, Calgary, Canada

Filed Jul. 15, 1985, Ser. No. 755,317
Int. Cl.[4] B66C *23/18*
U.S. Cl. 212—179 2 Claims



1. A material hoisting gin, comprising:

(a) a mounting bracket;

(b) releasable attaching means for releasably attaching said bracket to an upright pole;

(c) an unbraced support beam atop said bracket, said beam for extending transversely to the longitudinal axis of said pole;

(d) a bar suspendable from said beam such that said bar may be raised to bring said bar closely proximate to the base of said beam;

(e) engaging means on said bar for supportably engaging a load; and,

(f) lifting means cooperating with said beam and bar for raising or lowering said load with respect to said pole;

wherein:

(g) said beam is pivotally mountable atop said bracket in any one of a range of positions, such that said beam may pivot in a plane transverse to the longitudinal axis of said pole, thereby facilitating selectable positioning of the ends of said beam with respect to said load and said pole; and,

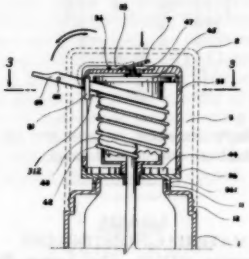
(h) said releasable attaching means comprises at least one strap for encircling said pole; and, ratchet means for tightening said strap around said pole.

4,684,032

PORTABLE THERMOS BOTTLE WITH RETRACTABLE SUCTION TUBE

Shung-Der Tsay, No. 14, Ta Chang 1st Road, Kaohsiung, Taiwan (800)

Filed Dec. 2, 1985, Ser. No. 803,646
Int. Cl.[4] A47G *21/18*; B65D *47/06*
U.S. Cl. 215—1 A 5 Claims



1. A portable thermos bottle with retractable suction tube comprising a case with stepped, threaded parts, a cup cover, an inner cover, a spiral reel and a flexible tube; said spiral reel having helical groove and projecting helical rib; said helical groove having a tube hole at the lower end; said spiral reel having upper and lower journals fitted within the inner cover and equipped with coiled springs; said inner cover consisting of an upper part and a lower part; said upper part of the inner cover having a catch slot and a sliding slot on which a slide block is slidably fitted; said flexible tube being wound on said spiral reel and having one end fitted in the bottle and another coming out of the slide block so that the flexible tube is retractable.

4,684,033

DEVICE FOR RETARDING OXIDATION OF PARTLY CONSUMED BOTTLE OF WINE

Edward J. Marcus, 35 E. 75th St., New York, N.Y. 10021

Filed Apr. 22, 1986, Ser. No. 854,601
Int. Cl.[4] B65D *39/12*
U.S. Cl. 215—269 7 Claims

1. Apparatus for retarding oxidation of a wine or other liquid that only partly fills a container formed with an opening through which said liquid can be poured, said apparatus comprising:

non-sealing cap means mountable adjacent to said opening;

inflation tube mean insertable through said non-sealing cap means;

air bladder means connected to said inflation tube means and postionable within said container;

pump means connected to said inflation tube means and positionable outside said container;

valve means connected to said pump means and said inflation tube means; and

exhaust tube means insertable through said non-sealing cap means and having an inlet portion positionable within said container and an outlet portion positionable outside said container;

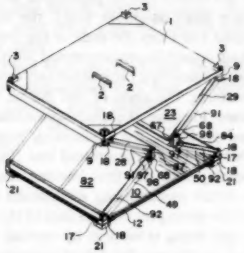
whereby, when said non-sealing cap means is mounted adjacent to said opening, said bladder means and said inlet portion of said exhaust tube means are positioned within said container, said pump means and said outlet portion of said exhaust tube means are outside said container, and said pump means is activated, said bladder means expands within and forms a seal with said container and expels air from said container through said non-sealing cap means both through and exterior to said exhaust tube means, so that oxygen is substantially prevented from coming into contact with said liquid.

4,684,034

FOLDING CONTAINER

Tatsuo Ono, Funabashi; Akira Masuda, Matsudo, and Kikuzo Kuramoto, Funabashi, all of Japan, assignors to Nisso Sangyo Co., Ltd., Japan

Filed Jan. 10, 1985, Ser. No. 690,142
Int. Cl.[4] B65D *6/18*
U.S. Cl. 220—6 9 Claims



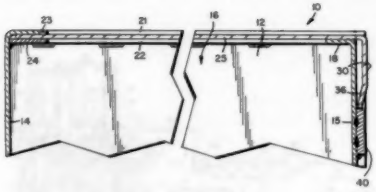
1. A folding container comprising a top wall, a bottom wall spaced from said top wall with said container in an unfolded condition, a pair of opposite side walls each connected betwen said top and bottom walls and on opposite sides of said wall comprising an upper portion pivotally mounted to opposite sides of said top wall and a lower portion pivotally mounted to opposite sides of said bottom wall, said upper and lower portions of each side wall being pivotally mounted to each other, said side walls being foldable inwardly for moving said top and bottom walls together to move said container into a closed position, each of said front and rear walls comprising a pair of upper portions pivotally mounted to respective upper portions of said side walls, and a pair or lower portions pivotally mounted to respective lower portions of said side walls, one side of said upper and lower portions of said rear and front walls being pivotal inwardly against said upper and lower portions of said side walls and other side of said upper and lower portion of said rear and front walls being against said top and bottom walls when said container is in its folded position.

4,684,035

THEFT RESISTANT CABINET FOR COIN OPERATED EQUIPMENT

George J. Hean, Sr., Five Appletree Sq., Bloomington, Minn. 55420

Continuation-in-part of Ser. No. 903,748, Sep. 5, 1986. This application Nov. 13, 1986, Ser. No. 930,715
Int. Cl.[4] B65D *43/20*
U.S. Cl. 220—346 15 Claims



1. A cabinet construction for resisting forceable entry comprising:

a base wall, first and second side walls extending generally perpendicularly from the base wall, and first and second end walls at the ends of said base wall and the first and second side walls and being fixedly secured to the base walls, and the first and second side walls;

track guide means along the edges of the first and second side walls and the first and wall at edges opposite from the base walls, the second end wall being formed to permit access from the second end to open ends of the track guide means;

a cover havng a main portion slidably interfitted with and mounted for movement with respect to said track guide means, and having a first edge portion that is adapted to be slidably interfitted with the track guide means on the first end wall, said cover having a cover wall flange bent at substantially right angles to the main portion which extends to overlap a portion of the second end wall adjacent the track guide means when the cover is closed, said flange resting against a portion of said second end wall when the cover is closed with the first edge portion of the cover interfittingly supported on the track guide means on the first end wall; and

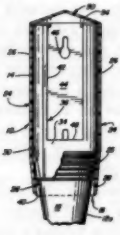
means for lockably drawing the cover to a position with portions of said second end wall and flange in engagement.

4,684,036

CUP DISPENSING SYSTEM

Clarence T. Brewer, Oak Park, Ill., assignor to Solo Cup Company, Urbana, Ill.

Filed Nov. 14, 1985, Ser. No. 797,874
Int. Cl.[4] B65G *59/10*
U.S. Cl. 221—61 15 Claims



1. A drinking cup dispenser for supporting a stack of drinking cups and permitting withdrawal of said cups one at a time;

said dispenser comprising a substantially tubular housing having a continuously curved, substantially elliptic bottom edge;

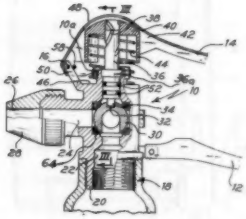
said housing defining an interior having a pair of downwardly, gradually and progressively converging side wall portions to engage the stack at only two diametrically opposed locations so that said stack may be supported by engagement between said stack of cups and said downwardly converging side wall portions of said housing near said bottom edge of said housing.

4,684,037

PERFECTED MECHANICAL CONTROL DEVICE FOR BALL VALVE TYPE VALVE SYSTEMS

Giuliano Gnutti, and Giordano Gnutti, both of Via Rango 18, 25065 Lumezzane S.S. (Brescia), Italy

Filed Jul. 10, 1984, Ser. No. 629,450
Claims priority, application Italy, Jan. 6, 1984, 19069 A/84
Int. Cl.[4] B67B *7/24*
U.S. Cl. 222—3 9 Claims



1. A container having a pressurized fluid and a valve system of the ball valve type for controlling the delivery of said pressurized fluid from said container and a control device for said valve system operable by the user with one hand, which comprises:

(a) a valve housing having a supply end, a discharge end, a perpendicular intersecting pair of passages connecting said ends a projection and an exterior surface;

(b) said ball valve housing passages which intersect at right angles located at the intersection of said perpendicular passages to control flow from said supply end of said valve housing to said discharge end;

(c) means for converting linear motion to rotational motion so as to rotate said ball valve which comprise:

(d) a male component comprising a gudgeon pin, located on said housing said gudgeon pin having an axis coaxial with said supply end of said valve housing and having a fixed end and a free end, said fixed end being torsionally fastened to said ball and having a plurality of circumferential grooves, said free end having a helical groove;

(e) a journal attached to said projection of said valve housing, said journal having an axis, said axis being orthogonal to the axis of said gudgeon pin;

(f) a lever, movable about said journal, having an inverted U-shaped cross section, and having a through hole in the upper part of said inverted U-shaped cross section and coaxial holes on sides thereof;

(g) a female component displaceably controlled by said movable lever and having a bore defining an inner surface, said bore having a helical projection on said inner surface, said helical projection engaging with said helical groove of said gudgeon pin, said female component being located between said sides of said movable lever. whereby it is displaced along the axis of the gudgeon pin to rotate said ball valve via said gudgeon pin so as to selectively control flow from said container when said movable lever is actuated,

wherein the axis of said journal passes through said coaxial holes and said gudgeon pin passes through said through-hole in said movable lever and a fixed lever is rigidly attached to said

valve housing and is located at a distance from said movable lever that both said levers are adapted for one-handed actuation.

4,684,038

DEVICE FOR TAPPING CONTAINERS FILLED WITH LIQUID

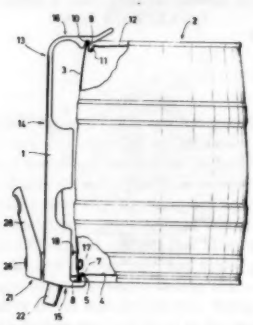
Herr K. Gaul, Kirchardt; Herr J. Mogler, and Herr H. Wiedmann, both of Heilbronn, all of Fed. Rep. of Germany, assignors to Gebruder Mogler GmbH & Co., Fed. Rep. of Germany

Filed Jun. 20, 1985, Ser. No. 746,973

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1984, 3429559

Int. Cl.[4] B67B *7/50*

U.S. Cl. 222—89 6 Claims



1. A device for tapping a side surface of tin cans having a lower base, an upper base, a vaulted shell connecting said lower and upper base as well as recessed flange rims between the shell and the lower and upper bases, respectively, said cans being filled with beer under pressure, said device comprising:

a mounting in the form of a one-armed lever to be connected with the can, the length of said lever corresponding substantially to the height of said can, said lever including:

a main section extending substantially vertically at said shell,

a lower section protruding in the same substantially vertical direction as said main section from the lower end of said main section toward said lower base, and

an upper section protruding in the same substantially vertical direction as said main section from the upper end of said main section toward said upper base of said can, said upper section being elastically connected with said main section,

at least one claw on said lower section to connect said lever pivotally with said flange rim between the lower base and the shell of the can,

at least one detent notch at the end of said upper section for detainably fixing said lever at said flange rin between the upper base and the shell of the can,

a tubular piercing member having a sharpened cutting rim and being immovably connected to said lower section of said lever and adapted to penetrate said shell near the flange rim between said lower base and said shell when said lever is positioned on said can,

a sealing collar being immovable with respect to and enclosing said tubular piercing member and protruding beyond said cutting rim of said tubular piercing member so that when the lever is fixed on the can the sealing collar abuts against the shell of the can sealingly while being compressed before the tubular piercing member penetrates said shell, and

a tap provided on said lower section of said lever and being connected to said tubular piercing member.

4,684,039

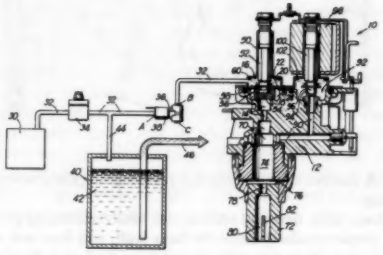
BEVERAGE DISPENSER VALVE ASSEMBLY SYSTEM FOR USE WITH PULPY CITRUS CONCENTRATE

Henry Wasserstrom, Chicago, and Richard T. Kennedy, Palos Heights, both of Ill., assignors to The Coca-Cola Company, Atlanta, Ga.

Filed Mar. 28, 1984, Ser. No. 594,189

Int. Cl.[4] B67D *5/56*

U.S. Cl. 222—129.1 4 Claims



2. A valve assembly for a beverage dispenser for dispensing a beverage mixed from a pressurized concentrate containing pulp and a pressurized diluent, comprising:

(a) a body including a concentrate passageway extending therethrough;

(b) a concentrate valving chamber in said body fluid communication with said passageway;

(c) a valve seat in said valving chamber through which valve seat all fluid in said passageway must flow;

(d) a flexible diaphragm extending across said chamber and sealing separating said chamber into a fluid pressure region and a concentrate region, said diaphragm being movable, under fluid pressure exerted thereon, from a closed postition in which it is in contact with said valve seat and closes said passageway, to an open position in which it is spaced from said seat and opens said passageway;

(e) means for maintaining said diaphragm in its closed position when the valve assembly is not being operated to dispense a beverage, comprising means for maintaining a fluid in said fluid pressure region under sufficient pressure to hold said diaphragm in its closed position against the pressure of any concentrate in said concentrate region;

(f) means for moving said diaphragm to its open position to operate said valve assembly to dispense a beverage therefrom, said moving means consisting of means for venting the pressure in said fluid pressure region and means for providing concentrate under pressure in said concentrate region;

(g) wherein said body also includes a diluent passageway extending therethrough, a diluent valving chamber in said diluent passageway, and valve means therein for controlling diluent flow therethrough, and including a mixing and swirling chamber and a discharge nozzle, and wherein said nozzle includes an elongated, vertical, cylindrical passageway therethrough and a flat elongated plate centrally positioned therein to reduce swirling of the fluid flowing therethrough; and

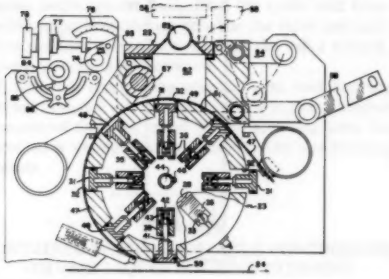
(h) said mixing and swirling chamber includes a flat, transverse surface at the end of a larger diameter passageway, said transverse surface having a smaller diameter central opening therein, such that some of the fluid flowing through said larger diameter passageway hits said transfer surface and splashes back into said larger diameter passageway increases the mixing thereof.

4,684,040

ROTARY VOLUMETRIC PISTON DISPENSER WITH ADJUSTABLE CAMMING ASSEMBLY, AND RINSING DEVICE

John A. Jonovic, Fitchburg; Bruce W. Stengel, DeForest, and Timothy G. Mally, Oregon, all of Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Sep. 12, 1985, Ser. No. 775,477
Int. Cl.[4] G01F *11/06*
U.S. Cl. 222—148 3 Claims



1. A rotary volumetric piston dispenser, comprising:

a rotary assembly that is rotable generally along its central axis, said rotary assembly having a chamber and a radially positioned cylinder extending from and communicating with the chamber, said rotary assembly having an axial channel at its axis and extending therethrough for receiving a supply of rinsing fluid and one or more nozzles connected to said axial channel for directing rinsing fluid outward radially into said rotary chamber;

a piston that is radially mounted on the rotary assembly and within said cylinder wherein said piston and cylinder define a compartment;

a cam track assembly generally adjacent to an axial end of said rotary assembly wherein said cam track assembly includes a fixed section, pivotal section means for varying the volume of said compartment, compression means for exerting a radially directed force on the material in said compartment, and swingable section means for radially extending said piston beyond the radial extent of said cylinder, whereby rinsing fluid flows in an outward direction of said cylinder;

a cam follower received by said cam track assembly, said cam follower being in operative engagement with said piston wherein movement of the cam follower along said cam track assembly effects radial movement of said piston;

manifold means for depositing material to be dispensed into said compartment;

means for rotating said compartment to a dispensing location at which the material separates from said compartment and from the rotary assembly and

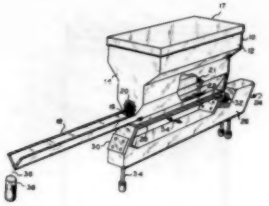
a strap member closely wrapped around a portion of the radially extended periphery of said rotary assembly, and said strap member further defines said compartment wherein said strap member includes a slot, said manifold means includes a mouth, and said slot and said mouth open into each other.

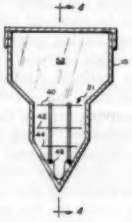
4,684,041

SOLID PARTICLE DISPENSING

Ronald D. Jones, and Joseph B. Cross, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 12, 1985, Ser. No. 722,884
Int. Cl.[4] B67D *5/64*
U.S. Cl. 222—161 3 Claims





1. An apparatus for dispensing solid particles comprising:

a hopper for containing the solid particles having an upper end, a lower end, and an interior surface which defines an interior cavity therein, said hopper having an outlet opening near said lower end and said hopper further having a larger cross-section at said upper end than at said lower end;

a screen unit, unattached to said hopper or any other member, which comprises a plurality of vertically stacked screen members of interwoven mesh disposed in said cavity so as to be enclosed by at least a portion of said hopper and so as to be capable of movement relative to said hopper in vertical and horizontal directions in response to movement of said hopper, and which further comprises a spacer means for maintaining said screen members in a fixed, spaced relationship, wherein said plurality of screen members includes a plurality of substantially parallel, horizontally disposed planar screen members and a curved bottom screen member which extends generally downward to said hopper lower end and which is adapted to rest said hopper interior surface so as to be in contact therewith adjacent said hopper lower end when said hopper is empty and upright; and

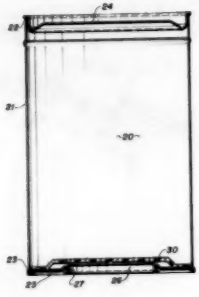
vibrating means for vibrating said entire hopper, whereby said hopper vibrates relative to said screen unit and whereby solid particles are dispensed out of said outlet opening.

4,684,042

CONTAINER AND FOLLOW PLATE ASSEMBLY USABLE WITH VISCOUS MATERIAL DISPENSERS HAVING RECEIVING PORTS OF TWO DIFFERENT SIZES

James E. Strickler, and Jeffrey E. Strickler, both of P.O. Box 1828, York, Pa. 17405

Filed Apr. 7, 1986, Ser. No. 848,498
Int. Cl.[4] B65D *47/36*
U.S. Cl. 222—327 **3 Claims**



1. A container and follow plate assembly for highly viscous material and adapted to be received selectively by first ans second dispensing devices having receiving ports of different sizes, comprising an elongate sidewall enclosing a contained volume of substantially uniform cross-section, the sidewall having first and second ends and a cross-sectional size and shape which fits the receiving port of the first dispensing device; a first removable membeer closing the first end; a second member fixed to and extending across the second end, the second member having a discharge opening therein of a size and shape which fits the receiving port of the second dispensing device; a removable cover for the discharge opening; and a follow plate within and in closely spaced relationship with the sidewall, the follow plate being adjacent to the second member when the container is filled with contents to be dispensed, the follow plate being constructed from a single piece of material and having an integral but removable section aligned with and of larger size than the discharge opening, the removable section adapted to be removed when the discharge opening is used to dispense contents.

4,684,043

SHIPPING SEAL FOR VISCOUS PRODUCT DISPENSER

Donald D. Foster, Lee's Summit, and Robert N. Hills, Raytown, both of Mo., assignors to Realex Corporation, Kansas City, Mo.

Filed Sep. 24, 1984, Ser. No. 653,297
Int. Cl.[4] B67D *5/42*
U.S. Cl. 222—386 **6 Claims**

1. In a viscous product pump dispenser having a discharge outlet covered by a valve member of the actuator of the pump during periods of non-use of the dispenser, the improvement comprising:

a disposable shipping seal in combination with the member for preventing unintentional discharge of product from the dispenser prior to the first intentional actuation thereof,

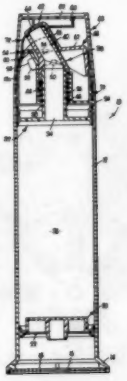
said seal comprising a relatively thin, flat, flexible, non-porous element removably covering said outlet between the latter and said valve member of the actuator,

said element including a manually accessible pull-tab portion projecting beyond said member when the latter is covering the outlet,

said element being flat throughout its entire extent and spanning said outlet without projecting into the same whereby to avoid retention of the element by the inside of the spout in the event the element is pulled lengthwise out from under the member to prepare the dispenser for operation,

said dispenser further including a main body and an overcap detachably secured to the body in enclosing relationship to said member, said seal and said outlet,

said overcap having structure disposed to yieldably engage said member when the latter is covering said outlet for pressing the member against the element,



said overcap being provided with a top wall normally disposed above said member and a continuous, annular sidewall depending from the periphery of said top wall,

said structure comprising a resilient skirt spaced inwardly from the sidewall and depending from said top wall to press downwardly against the member from above the latter.

4,684,044

VISCOUS PRODUCT DISPENSER HAVING EXTERNALLY LOCATED, DISPENSED PRODUCT SHEARING OUTLET VALVE PROVIDED WITH LOST-MOTION ACTION

Donald D. Foster, Kingsville, Mo., assignor to Realex Corporation, Kansas City, Mo.

Continuation of Ser. No. 589,640, Mar. 14, 1984, abandoned. This application Jun. 17, 1986, Ser. No. 876,647
Int. Cl.[4] B67D *5/42*
U.S. Cl. 222—386 **7 Claims**

1. In a dispenser for viscous products having an outlet in the

outwardly facing end surface of a product discharge spout controlled by an external valve which opens and closes the outlet, said valve being disposed at one end of and movable with an actuating lever which is coupled with means for forcibly discharging product out of the spout when the lever is depressed, the improvement comprising:

means mounting the valve for transverse shearing movement of the latter entirely across the outlet and into closed, covering relationship with said end surface of the spout during return of the valve with the lever at the conclusion of product discharge whereby to promote severance of a dispensed bead of product from that remaining in the spout,

said dispenser having its surface portion most adjacent the spout outlet spaced away from the outlet and from the valve to prevent contact between the valve and said surface portions during movement of the valve toward and away from its closed position,

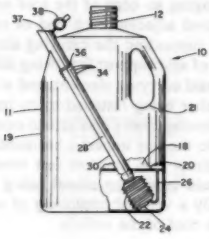
said actuating lever being coupled with said discharging means in such a way that said valve is at least substantially uncovered from the outlet by the actuating lever before product is attempted to be discharged by said discharging means.

4,684,045

CONTAINER WITH ADJUSTABLE CONTROLLED VOLUME LIQUID POURING ELEMENT

Peter T. Su, 15 Valley Forge, Houston, Tex. 77204

Filed Jan. 15, 1986, Ser. No. 819,062
Int. Cl.[4] G01F *11/26*
U.S. Cl. 222—456 **18 Claims**



1. A portable liquid container for gravity induced dispensing of measured volumes of liquid, comprising:

(a) container housing means having side walls and a bottom wall forming a storage chamber for containing a quantity of liquid and adapted to rest in an upright position on a surface;

(b) means defining a liquid measuring chamber located at least partially below said bottom wall and having a dispensing outlet and forming a measurement chamber having a volume that is adjustable according to the volume of liquid selected for dispensing; and

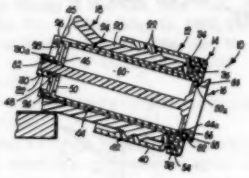
(c) a tubular element forming a liquid passage extending from said bottom wall to said liquid measuring chamber and permitting gravity induced filling of said liquid measuring chamber from said storage chamber when said portable liquid container is in its upright position, said tubular element permitting gravity dispensing of measured liquid from said liquid measuring chamber and preventing transfer of liquid from said storage chamber to said liquid measuring chamber when said portable liquid container is tilted to its dispensing position, said tubular element being located at the upper portions of said bottom wall and said measurement chamber at said dispensing position of said portable liquid container.

4,684,046

UNIT DOSE LIQUID DISPENSER HAVING PRECISE DOSAGE CAPABILITIES

Donald D. Foster, Lee's Summit, and Phil L. Nelson, Kansas City, both of Mo., assignors to Realex Corporation, Kansas City, Mo.

Filed Sep. 16, 1985, Ser. No. 776,683
Int. Cl.[4] G01F *11/28*
U.S. Cl. 222—451 **4 Claims**



1. Apparatus for repeatedly dispensing measured amounts of liquid product from the outlet neck of a container, said neck presenting an outlet opening, said apparatus comprising:

a first body including

a tubular first member being received within said neck and having an inner end and an outer end and presenting, adjacent the outer end thereof, a generally U-shaped in cross-section connection portion for receiving said outlet neck;

an annular, axially oriented wall extending outwardly from said connection portion;

structure defining a fluid inlet opening adjacent said inner end;

base means adjacent said inner end;

an elongated, axially oriented stem coupled with said base means and extending towards said outlet end,

said stem presenting a sealing member adjacent the outer end thereof,

said sealing member having a generally frustoconical sealing surface;

a second body including

a second tubular member having an inner end and an outer end, said second member being telescopically and rotatably received within said first member,

said second tubular member including a radially outwardly extending coupling flange adjacent said outer end thereof,

said flange having means defining an annular slot receiving said annular wall, and an inboard, generally frustoconical sealing surface complemental with the sealing surface of said sealing member,

there being means operatively coupling said annular wall and slot-defining means for relative rotative movement between said first body and said second body;

an end wall adjacent said inner end of the second member,

said end wall including a sealing section and being apertured for slidably receiving said stem,

said end wall further having a fluid port therethrough,

said first and second tubular members cooperatively defining a measuring chamber,

said second tubular member being bidirectioally rotatable relative to said first tubular member between a dispensing position and a filling position,

said sealing section of said end wall, and said base means, cooperatively closing said opening and said port when said second tubular member is in the dispensing position thereof, and said fluid inlet opening and said fluid port being open when said second tubular member is in said filling position thereof,

said sealing surface of said first body and said sealing surface of said second body being adapted for defining therebetween a dispensing aperture,

said dispensing aperture being formed when said second

body is in said dispensing position and said dispensing aperture being closed when said second body is in said filling position.

4,684,047

BELT-MOUNTED BOW AND ARROW SUPPORT DEVICE AND METHOD

Michael Burgwin, 408 Stolp Ave., Syracuse, N.Y. 13207

Filed Oct. 31, 1986, Ser. No. 925,740
Int. Cl.[4] A45F 5/00
U.S. Cl. 224—253 10 Claims

1. A device for attachment to an archer's wearing apparel for carrying a bow with an arrow engaged with the bow string, said device comprising:

(a) a portion adapted for connecting said device to a portion of the archer's wearing apparel at the waist;

(b) a pair of members extending from said connecting portion to form a pair of spaced, V-shaped portions opening upwardly;

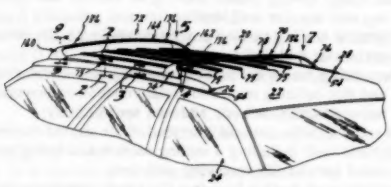
(c) a pair of parallel members integrally connected to said V-shaped portions and centrally disposed therebetween in spaced relation, whereby a bow may be carried by placing the bow string upon said V-shaped members with the notched end of an arrow engaged with said bow string between said parallel members to suspend said arrow downwardly from said bow string across the bow handle.

4,684,048

VEHICLE ARTICLE CARRIER

John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236

Filed Sep. 20, 1985, Ser. No. 778,385
Int. Cl.[4] B60R 9/00
U.S. Cl. 224—326 6 Claims



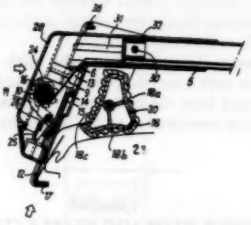
1. An article carrier adapted to be secured to a motor vehicle adjacent to a generally horizontally extending body surface on said vehicle comprising a pair of elongated support members secured to said vehicles having upper article supporting surfaces on the upper sides of said support member, a longitudinally extending channel disposed interiorly of said support member, and clamping surfaces extending longitudinally within the interior of the channel interior to said support member, at least one cross member having two end portions, and means for locking said cross member in a selected position on each support member, said locking means disposed entirely on each end portion of said cross rail when said locking means is removed from said support member and engageable with the corresponding channel of said corresponding support member wherein said cross rail is capable of removal at any location along the length of said support member and said locking means is not intended to be disassembled during separation from said support member.

4,684,049

VERSATILE CARRYING BAR FOR CARS WITH AND WITHOUT GUTTERS

Jacques Maby, and Jean L. Maby, both of Montfleuri - Petit Parame, 34500 Saint-Malo, France

Filed Sep. 3, 1985, Ser. No. 771,773
Claims priority, application France, Sep. 6, 1984, 84 13735
Int. Cl.[4] B60R 9/00
U.S. Cl. 224—329 10 Claims



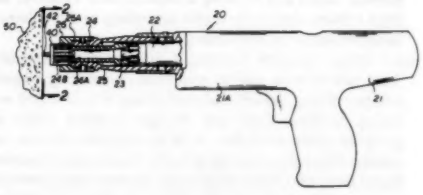
1. A carrying bar for installation on a car roof, with or without gutters, including a carrying element having opposite ends, each of which is engaged with a support foot, a flexible member having opposite ends each connected to a said support foot, respectively, a catching element arranged on each support foot for engaging an edge of the roof and a bearing element being disposed adjacent each end of said carrying element for flexibly supporting the carrying element on the car roof, at least one of said support feet being slidably connected with one end of said carrying element, and at least one end of said flexible member being fastened to its respective support foot through tensioning means operable to exert tension on said flexible member to thereby impart a horizontal tension to said support feet to draw said support feet towards each other simultaneously, said tensioning means being located so as to impart additionally a vertical tensioning of said carrying element towards the roof of the vehicle.

4,684,050

POWDER ACTUATED FASTENING SYSTEM AND FASTENER ASSEMBLY FOR USE THEREWITH

Fernando Masas, 30 Stagg St., Stratford, Conn. 06497

Filed Oct. 7, 1985, Ser. No. 785,274
Int. Cl.[4] B25C 1/08, 1/14, 1/18
U.S. Cl. 227—10 8 Claims



1. A power actuated fastening system including a power actuated gun having a nose sleeve and a fastener guide having a bore defining the muzzle end of said gun slidably mounted relative to said nose sleeve whereby said fastener guide must be forceably retracted into said nose sleeve before said gun can be

fired. the improvement comprising a holder having a bore by which said holder is fitted to the end of said nose sleeve,

said holder having a front end circumscribing said fastener guide and adapted to be urged in normal bearing relationship to a wall

means for securing said holder to said nose sleeve, a fastener means positioned in said holder,

said fastener means including a member having a plannar surface adapted to be retained in said holder and engaging said fastener guide,

said member having an aperture extended through the thickness of said plannar surface,

said aperture being disposed in alignment with said bore of said fastener guide,

a stud extended through said aperture of said plannar surface, said stud having a shank portion frictionally secured to said aperture, and

said stud having a head portion sized to be snugly received in the bore of said fastener guide whereby said member and said head portion of said stud maintains said stud normal to a wall during a firing operation of said gun as said front end of said holder insures said normal position of said stud.

4,684,051

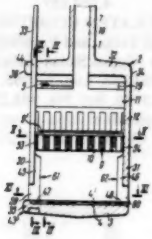
SURGICAL INSTRUMENT

Ernest M. Akopov, ulitsa Borisa Galushkina, 12, korpus 2, kv. 28; Valery E. Schitinin, ulitsa Butyrskaya, 53/63, kv. 104, and Anna V. Arapova, Krasnostudenchesky proezd, 21, kv. 44, all of Moscow, U.S.S.R.

Filed Sep. 5, 1985, Ser. No. 772,733

Int. Cl.[4] A61B *17/00*

U.S. Cl. 227—19 **11 Claims**



1. A surgical instrument for placing linear staple sutures, comprising:

a body;

a closed rectangular frame forming part of said body and established by a first and a second lateral side and a third and a fourth side arranged therebetween;

a first and a second slot, similar to each other and provided in said respective first and second frame lateral sides, each of said slots having its geometrical axis parallel to said respective first and second lateral sides of said frame;

a die fixed on said third side of said frame; said die having a plurality of recesses facing an internal side of said frame, and having portions with extreme recesses situated within said first and second slots;

a staple head mounted in said frame opposite to said die and traversably with respect to said frame;

a detachable staple magazine adapted to be installed in said staple head; said detachable magazine having a number of staple slots and portions with extreme staple slots and adapted to be set in the suturing position with respect to said frame so that said magazine portions with the extreme staple slots are arranged inside said first and second lateral sides of said frame opposite to said respective portions of said die with said extreme recesses;

a staple ejector movably fitted in said staple head and so arranged as to correspond to said staple slots of said magazine;

an actuator of said staple head, accommodated in said body; and

an actuator of said staple ejector, accommodated in said body.

4,684,052

METHOD OF BRAZING CARBIDE USING COPPER-ZINC-MANGANESE-NICKEL ALLOYS

Allen S. McDonald, Bridgeport, Conn.; Charles W. Philp, New York, and Thomas A. Sperakis, E. Elmhurst, both of N.Y., assignors to Handy & Harman, New York, N.Y.

Division of Ser. No. 734,944, May 16, 1985, Pat. No. 4,631,171.

This application Sep. 22, 1986, Ser. No. 909,647

Int. Cl.[4] B23K *1/04, 35/30*

U.S. Cl. 228—122 **17 Claims**

1. A method for joining a carbide compound to a substrate which comprises:

(a) providing a brazing product having a copper alloy composition consisting essentially of about 43 to 57 weight percent copper, about 23 to 37 weight percent zinc, about 7 to 13 weight percent manganese, about 7 to 13 weight percent nickel, and between about 0.05 and 2 weight percent silicon; and

(b) brazing the carbide compound to the substrate with said brazing product at a temperature above the liquidus temperature of the copper alloy composition.

4,684,053

METHOD OF PRODUCING A PLATE OF STEEL

Thorwald Fastner; Max Mayrhofer, and Walter Taschner, all of Linz, Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria

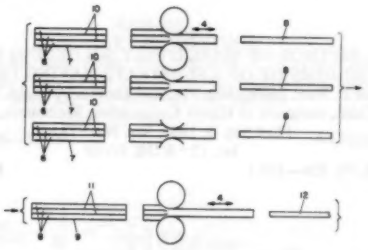
Continuation of Ser. No. 324,837, Nov. 25, 1981, Pat. No. 4,493,452. This application Nov. 5, 1984, Ser. No. 638,871

Claims priority, application Austria, Dec. 2, 1980, 5879/80

The portion of the term of this patent subsequent to Jan. 15, 2002, has been disclaimed.

Int. Cl.[4] B23K *20/04*

U.S. Cl. 228—158 **4 Claims**



1. A method of producing a thick plate of steel by hot-rolling a prematerial in several passes, which method comprises the steps of

forming at least two packs each comprised of at least two cast slabs of steel constituting said prematerial, each of said packs being formed of slabs of equal steel quality and of equal widths which are machined on at least one broad sideface, each in a manner that the conditions for roll-bonding are met, said slabs being superposed so that the machined broad sidefaces come into contact,

welding said at least two packs so as to obtain rolling ingots,

superposing said rolling ingots

securing said rolling ingots against displacement relative to one another,

heating said rolling ingots to a relative temperature, and

subsequently roll-bonding said rolling ingots to reduce the thickness of said rolling ingots and to weld said rolling ingots together simultaneously in several passes.

4,684,054

AUTOMATIC SOLDERING APPARATUS AND METHOD OF USING THE FLUX TO HEAT THE CIRCUIT BOARD

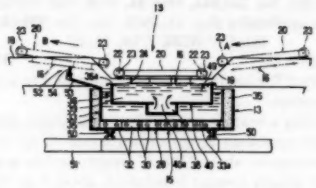
Yamahiro Iwasa; Atsushi Kabe, both of Hachioji, and Yoichi Oba, Higashiyamato, all of Japan, assignors to Asahi Chemical Research Laboratory Co., Ltd., Japan

Filed Mar. 12, 1986, Ser. No. 838,825

Claims priority, application Japan, Mar. 30, 1985, 60-67707; Apr. 19, 1985, 60-85266

Int. Cl.[4] B23K *1/20*

U.S. Cl. 228—180.1 12 Claims



1. A method for automatically soldering a printed base board comprising the steps of:

(a) heating a flux up to a predetermined temperature in a range of 100° C.–150° C.;

(b) contacting said heated flux to a face of said printed base board to thereby coat said face of said printed base board and to simultaneously heat said printed base board with said heated flux until said printed base board is heated up to said predetermined temperature of said flux; and

(c) contacting said face of said printed bae board to a melted solder of a higher soldering temperature.

4,684,055

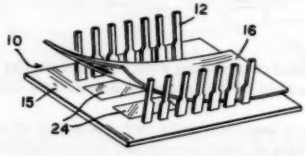
METHOD OF SELECTIVELY SOLDERING THE UNDERSIDE OF A SUBSTRATE HAVING LEADS

Scott D. Baer, Indialantic, Fla., and Thomas P. Glenn, Modesto, Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed Sep. 9, 1985, Ser. No. 771,846

Int. Cl.[4] B23K *31/02*

U.S. Cl. 228—180.1 10 Claims



1. The method of applying solder to metallic areas of a substrate comprising:

placing a solder carrier having solder paste adhered to said carrier on one surface onto a substrate surface in predetermined areas having metallic and non-metallic areas, wherein said solder paste surface of said carrier faces said substrate surface and said paste areas substantially coincide with said metallic areas;

heating said solder carrier and substrate to transfer said solder to said metallic areas; and

remove said carrier from said substrate.

4,684,056

VIBRATORY WAVE SOLDERING

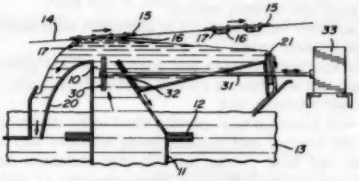
Carlos A. Deambrosio, Montreal, Canada, assignor to Electrovert Limited, Toronto, Canada

Filed Feb. 19, 1986, Ser. No. 830,962

Claims priority, application United Kingdom, May 3, 1985, 8511280; Canada, Nov. 8, 1985, 494984

Int. Cl.[4] B23K *31/02*

U.S. Cl. 228—180.1 39 Claims



1. Process for wave soldering a prefluxed element comprising the steps of:

moving the element in a predetermined path;

forming a solder wave having a predetermined configuration beneath the path so that at least a portion of the element passes through the solder wave; and

producing an oscillation in the solder wave in the range of about 20 to 400 Hz during the passage of the element therethrough, the oscillation not substantially changing the predetermined configuration of the solder wave.

4,684,057

HEAT INSULATED COOKING UTENSIL

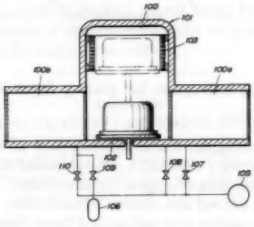
Kenichi Miyaji; Shouji Toida, and Yoshinori Arai, all of Niigata, Japan, assignors to Nippon Sanso Kabushiki, Tokyo, Japan

Division of Ser. No. 763,468, Aug. 7, 1985. This application Sep. 3, 1986, Ser. No. 903,274

Claims priority, application Japan, Aug. 8, 1984, 59-166018

Int. Cl.[4] B23K *20/02, 20/14*

U.S. Cl. 228—187 7 Claims



1. A method of manufacturing a vacuum-heat-insulated cooking utensil comprising the steps of:

providing inner and outer container each made of metal and having a tubular side wall and an end wall closing one end of said side wall, the side wall of said outer container having an inner diameter greater than an outer diameter of the side wall of said inner container;

placing said inner container in said outer container in coaxial relation to provide a container assembly, with a first brazing material sandwiched between said end walls of said inner and outer containers and with a second brazing material disposed between said side walls adjacent to other ends thereof, an annular space being formed between said side walls, said second brazing material having a melting point higher than that of said first brazing material, said other ends of said side walls being spaced from

each other a predetermined distance to provide an evacuation gap;

placing said container assembly in a vacuum chamber with an axis thereof disposed vertically and with said other ends of said side walls disposed at a level lower than said end walls;

evacuating said vacuum chamber to evacuate said annular space through said evacuation gap;

subsequently heating said container assembly in said vacuum chamber to a temperature to melt said first and second brazing materials, so that the molten first brazing material fills a space formed between said end walls and so that the molten second brazing material flows into said evacuation gap;

subsequently cooling said container assembly to a temperature to solidify said molten second brazing material to close said evacuation gap; and

subsequently cooling said container assembly to a temperature to solidify said molten second brazing material to close said evacuation gap; and

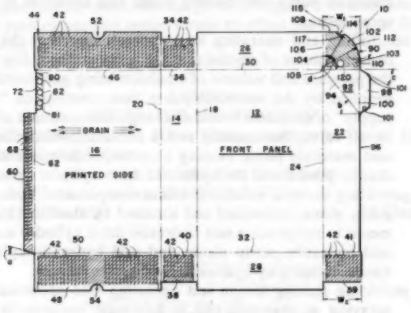
subsequently increasing pressure in said vacuum chamber to such a level to move said end walls toward each other and cooling said container assembly to a temperature to solidify said molten first brazing material.

4,684,058

CARTON WITH POUR SPOUT

Frank J. Weber, St. Louis, Mo., assignor to Ralston Purina Company, St. Louis, Mo.

Filed May 22, 1986, Ser. No. 866,117
Int. Cl.[4] B65D *5/72*
U.S. Cl. 229—17 R **15 Claims**



1. A container with an integrally formed pour spout, said container comprising:

a front panel, a rear panel and side panels joining said front and rear panels along fold lines;

top and bottom closure flaps joined to said front and rear panels;

a pour spout, said pour spout including a generally triangular flap joined to one of said side panels along an angled fold line, said triangular flap including a lateral edge and a top edge, a closure tab joined to said lateral edge along a fold line, and a dust flap joined to said top edge along a fold line, said dust flap defining a notch positioned to engage a top edge of said rear panel when the spout is in an open position; and

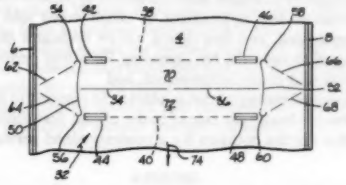
a glue applied to an area of said rear panel and engaging a portion of said closure tab prior to opening said spout, said rear panel being joined to said one of said side panels by a securement flap, said securement flap terminating at said area and wherein said rear panel includes an offset lateral edge defining an inwardly spaced notch dimensioned so that said closure tab may be inserted inside of said container to reclose said pour spout.

4,684,059

CARTON CARRYING HANDLE

Kevin R. Rusnock, Boulder, Colo., assignor to Adolph Coors Company, Golden, Colo.

Filed Jun. 27, 1986, Ser. No. 879,813
Int. Cl.[4] B65D *5/46*
U.S. Cl. 229—52 B **15 Claims**



1. A carrying handle for a carton having interconnected top, bottom side walls and end closure panels comprising:

a plurality of spaced apart, transverse, linear aligned slits in one of said interconnected walls, said one wall having opposed longitudinal edges and having a longitudinal extend greater than its transverse extent;

a pair of linear fold lines on opposite sides of said plurality of slits and parallel to said plurality of slits;

said fold lines having scored end portions spaced from one and the other of said longitudinal edges;

a pair of end slits having portions thereof extending between and in close proximity to said scored end portions of said fold lines so that a portion of said one wall may be pushed inwardly into said carton and folded around one of said fold lines to form a carrying handle;

each of said pair of end slits having J-cut portions extending toward one of said longitudinal edges; and

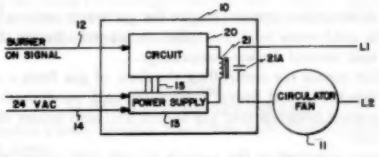
a first pair of side slits and a second pair of side slits, each side slit extending between and in close proximity to one of said J-cut portions and said one or said other of said longitudinal edges.

4,684,060

FURNACE FAN CONTROL

John T. Adams, Saint Louis, Mo., and Dale A. Mueller, Plymouth, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 23, 1986, Ser. No. 866,553
Int. Cl.[4] F23N *5/20*
U.S. Cl. 236—11 **4 Claims**



1. A fan control for use in system for controlling the termination operation of an air circulating fan delivering temperature conditioned air to a space in response to an operating time of a temperature conditioning apparatus comprising:

circuit means having an input circuit and an output circuit,

circuit connection means adapted to connect said input circuit to receive a signal when the temperature conditioning apparatus is operating,

second circuit connecting means adapted to connect an output signal of said output circuit to maintain the air circulating fan operating, and

power supply means adapted to be connected to a source of

power, said power supply means having an output connected to said circuit means,

said circuit means having variable delay means for delaying the termination of said air circulating fan operation in response to the total period of each continuous operation of said temperature conditioning apparatus, wherein

said circuit means comprises first and second timing circuits,

said first timing circuit being reset to zero when said signal indicative of temperature condition apparatus operation is received and commences to count when said signal is terminated, said first timing circuit maintains said output signal to keep the fan operating for a first period of time until said count is completed, and

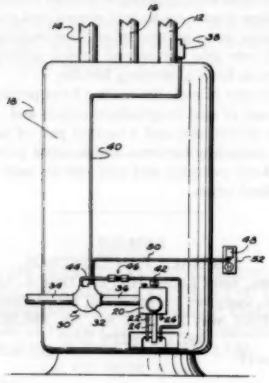
said second timing circuit is adapted to respond to fan operation to change the rate of count of said first timing circuit after the fan operates for a predetermined period.

4,684,061

WATER HEATER SECONDARY CONTROL DEVICE

Bodh R. Subherwal, Huntington Beach, Calif., assignor to BR Laboratories, Inc., Huntington Beach, Calif.

Filed Sep. 23, 1985, Ser. No. 779,203
Int. Cl.[4] F23N *1/08*
U.S. Cl. 236—20 R **3 Claims**



1. A secondary control device for gas water heaters having a tank, cold water inlet, hot water outlet and a heater thermostat, said control device comprising:

valve means for controlling the flow of gas from a source thereof to said heater thermostat, said valve means connected between said gas source and said heater thermostat;

means attached to the outside of said cold water inlet for sensing the temperature of water in said cold water inlet and providing an electrical signal representative thereof, said signal generated by said temperature sensing means being connected to said valve means;

means for opening said valve means for transmitting said gas to said heater thermostat when said signal is representative of the temperature of said cold water being less than a predetermined temperature; and

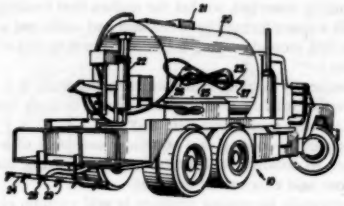
means for closing said valve means for preventing transmission of said energy to said heater thermostat when said signal is representative of the temperature of said cold water being equal to or greater than said predetermined temperature.

4,684,062

PUMPING SYSTEM FOR MOBILE PROTECTIVE COATING SPRAY APPARATUS AND OTHER APPLICATIONS

Maury L. Bagwell, Carrollton, Ga., assignor to Neal Manufacturing Company, Inc., Villa Rica, Ga.

Filed Jun. 28, 1985, Ser. No. 749,759
Int. Cl.[4] B05B *17/04, 1/20*
U.S. Cl. 239—1 **27 Claims**



10. A method for controlling the flow and pressure requirements of apparatus for spraying asphalt or coal-tar-pitch emulsion material comprising:

providing a reservoir containing said emulsion,

providing spray means for spraying said emulsion,

providing an on-off valve means for controlling the flow of emulsion to said spray means,

providing pumping means for pumping said emulsion through discharge line means to said on-off valve and thence to said spray means,

providing hydraulic drive cylinder means to reciprocate a materials pump and thereby pump said emulsion to said spray means,

controlling and operating said apparatus so that the discharge volume of emulsion at the spray means is less than the pressure and volume of emulsion being generated and supplied by the materials pump thus creating an "over supply" of emulsion in said discharge line upstream of said on-off valve, the resulting rise in material pressure within said materials pump causing a corresponding rise in hydraulic pressure in the hydraulic drive cylinder means,

providing variable volume pressure compensated hydraulic pump means controlled and actuated by electrical circuit means to reciprocate said hydraulic drive cylinder means, said hydraulic pump means and said hydraulic cylinder means comprising hydraulic fluid system means,

providing sensing means and operating said apparatus for spraying so that said rise in hydraulic pressure in said hydraulic drive cylinder means causes said variable volume pressure compensated hydraulic pump to reduce its volume of a hydraulic oil being pumped and supplied to said hydraulic drive cylinder means so as to maintain a preset, maximum compensated pressure (e.g. 650 psi) in the hydraulic fluid system means, said reduction in volume in turn reducing the hydraulic oil supply to the reciprocating hydraulic drive cylinder means thereby causing the drive cylinder means to reduce its speed of reciprocation, thereby in turn reducing and regulating the speed of the materials pump driven by said hydraulic drive cylinder means which in turn decreases the materials pressure in the discharge line thereby controlling said discharge line pressure to a maximum preset emulsion material pressure of, for example, approximately 70 psi, which corresponds to a maximum preset design pressure in the hydraulic fluid system means of, for example, the previously mentioned 650 psi, whereby when the apparatus for spraying emulsion is again turned on at the on-off valve by the operator, the emulsion pressure immediately falls activating said sensing means and causing the variable volume pressure compensated hydraulic pump to again begin to supply the hydraulic drive cylinder with hydraulic oil to

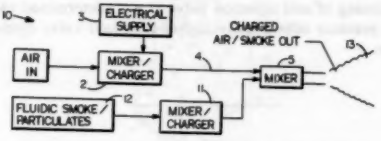
automatically maintain material pressure in response to the volume of material flow.

4,684,063

PARTICULATES GENERATION AND REMOVAL

Paul R. Goudy, Jr., Milwaukee, Wis., assignor to Autotrol Corporation, Milwaukee, Wis.

Filed Aug. 29, 1984, Ser. No. 645,810
Int. Cl.[4] B05B 5/00; B03C 3/04
U.S. Cl. 239—2.1 29 Claims



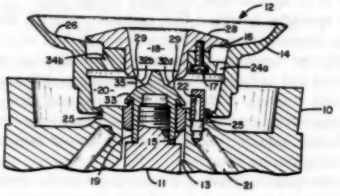
1. Apparatus for generating a relatively long term suspension of a first particulate/first fluid material in a suspension fluid, comprising fluid mixer/charger means for simultaneously thoroughly mixing and electrically charging a second fluid, and distributing means for distributing such charged second fluid and such particulate/first fluid material in such suspending fluid, said mixer/charger means comprising inlet means for receiving an input flowing fluid, outlet means positioned to receive fluid from said inlet means for directing an output flowing fluid, said inlet and outlet means including cooperative means for dividing at least one stream of fluid into plural streams and for at least once changing at least one of the relative flow direction and relative location of at least part of one of such streams, and charge coupling means for coupling or removing an electrical charge with respect to at least one of said inlet means and outlet means to affect the charge of fluid flowing in the device.

4,684,064

CENTRIFUGAL ATOMIZER

Kui-Chiu Kwok, Arden Hills, Minn., assignor to Graco Inc., Minneapolis, Minn.

Filed Aug. 19, 1985, Ser. No. 766,526
Int. Cl.[4] B05B 3/10
U.S. Cl. 239—223 12 Claims



1. A centrifugal atomizer head adapted for axial connection to the front end of a high speed centrifugal atomizer rotating member, for atomizing liquid forwardly of said rotating member, comprising

(a) a central inner disk assembly having a forwardly facing disk surface, a shank adaptable for axial connection to said rotating member, and a throat section intermediate said forwardly facing disk surface and said shank, and said central inner disk assembly having an axial recess, said recess extending rearwardly from said forwardly facing disk surface to the region of said throat, a plurality of first bores extending rearwardly from the bottom of said recess and a plurality of second bores extending inwardly through said throat section to intersect said first bores, thereby forming passages between said first bores and said second bores, said passages having a sharp edge discontinuity at the intersection of each of said first and second bores to provide a zero length dimension in said passages;

(b) an outer disk affixed to said central inner disk assembly, said outer disk having a forwardly facing surface spaced away from and extending forwardly of said central inner disk forwardly facing surface, said outer disk further having a plurality of annular passage segments placed rearwardly of said central inner disk forwardly facing surface, said outer disk further having a rear section at least partially closing about said central inner disk assembly to form a chamber therebetween; and

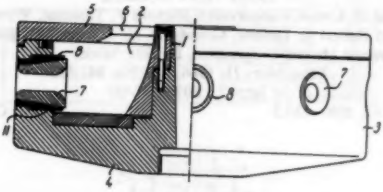
(c) axially offset means for feeding liquid into said chamber formed between said outer disk and said central inner disk assembly, for causing liquid flow through said plurality of passages passing through said throat section and through said plurality of annular passage segments.

4,684,065

ATOMIZER WHEEL WITH STEEL BUSHINGS

Lauge Svarrer, Hvidovre, Denmark, assignor to A/S Niro Atomizer, Soborg, Denmark

Filed Apr. 10, 1986, Ser. No. 850,306
Claims priority, application Denmark, Apr. 10, 1985, 1607/85
Int. Cl.[4] B05B 3/10
U.S. Cl. 239—224 2 Claims



1. An atomizer wheel for atomizing slurries of a highly abrasive material, comprising a wheel hub (1) and a mainly cylindrical external wall (3) defining an annular chamber (2) of a substantially bowl-like cross-sectional shape coaxially surrounding said hub (1), a number of substantially horizontal and radial ejection apertures distributed over the circumference of said external wall (3), a lining (7) of a wear-resistant sintered material being arranged in each of said apertures by means of a replaceable steel bushing (8) fitting loosely with respect to said external wall, said bushings (8) as well as said linings (7) projecting into said annular chamber, characterized in that a flat recess (13) is formed in the internal side of each bushing (8) facing the lining (7) arranged therein, said recess extending in the axial direction of the bushing (8) on either side of the inner surface of said external wall (3).

4,684,066

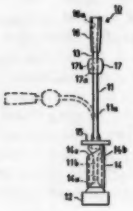
FLEXIBLE TUBE SPRINKLER

Mordechai Uzrad, Moshav Ein-Ayala, D.N. Hof HaCarmel 30 825, Israel

Continuation-in-part of Ser. No. 507,153, Jun. 23, 1983, abandoned. This application Aug. 21, 1985, Ser. No. 767,908
Claims priority, application Israel, Mar. 22, 1985, 74688
Int. Cl.[4] B05B 1/28, 3/00
U.S. Cl. 239—229 16 Claims

1. A flexibe tube sprinkler comprising a connector at one end for connecting same to a source of pressurized water, a nozzle at the opposite end for discharging the water, and a flexible tube between said connector and nozzle permitting free movement of the nozzle by the weight thereof and by the reaction forces of the water discharged therefrom; characterized in that said sprinkler further includes a rigid sleeve enclosing the connector end of said flexible tube, said rigid sleeve having an axial bore therethrough of larger diameter for its complete

length than the external diameter of the connector end of the flexible tube such that there is a clearance space between the complete length of the inner face of said rigid sleeve and the outer face of said connector end of the flexible tube permitting



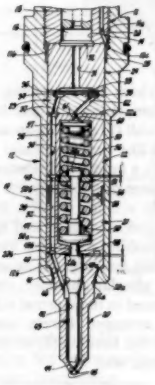
said rigid sleeve freely to move laterally, rotatably and axially with respect to said flexible tube and to be impacted by the flexible tune during the operation of the sprinkler to control the movements of the flexible tube and thereby the distribution of the water discharged from said nozzle.

4,684,067

TWO-STAGE, HYDRAULIC-ASSISTED FUEL INJECTION NOZZLE

David H. Cotter, Coopersville; Richard F. Teerman, Wyoming, and Robert C. Timmer, Grandville, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 21, 1986, Ser. No. 842,553
Int. Cl.[4] F02M *45/00*
U.S. Cl. 239—533.3 **3 Claims**



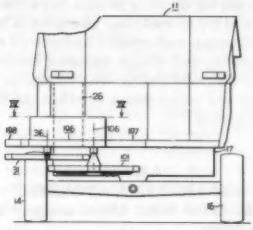
1. A fuel injection nozzle for internal combustion engines including, in combination, a nozzle body means having a fuel inlet means at one end thereof and a fuel injection spray orifice means at its opposite spray outlet end with a discharge passage means interconnecting said inlet means to said spray orifice means; a valve seat in said passage means upstream of said spray orifice means, a spring chamber means in said nozzle body means intermediate said ends, a pressure actuated injection valve in said nozzle body movable relative to said valve seat and having one end thereof extending into said spring chamber means, a first spring means and second spring means in said spring chamber means operatively connected to each other and to said injection valve to effect the opening of said injection valve in two stages is controlled by said first spring means and said second spring means with a first stage opening as controlled by said first spring and a second stage opening as controlled by both said first and second springs, a valve controlled orifice passage means in flow communication at one end with said discharge passage means and at its opposite end with said spring chamber means, said valve controlled passage means including an orifice passage and an enlarged passage, a valve means associated with said enlarged passage portion of said valve controlled orifice passage means and normally biased by one of said spring means so as to block flow through said orifice passage means; and, a drain orifice passage means in flow communication at one end with said spring chamber means and connectable at its opposite end to a source of low pressure fuel, said valve means being operative to open at a predetermined pressure whereby pressurized fluid entering said spring chamber means will act on said injection valve to effect closing of said injection valve at a predetermined valve closing pressure substantially higher than said valve opening pressure.

4,684,068

DUAL ROTATING SPREADERS FOR HARVESTER DISCHARGE

Garry W. Busboom, Independence, Mo., assignor to Deutz-Allis Corporation, Milwaukee, Wis.

Filed Jan. 17, 1986, Ser. No. 819,628
Int. Cl.[4] A01C *17/00*; B05B *1/28*
U.S. Cl. 239—665 **17 Claims**



1. A dual spreader arrangement for spreading the crop material discharged from a downwardly open discharge opening at the rear of an agricultural harvester comprising:

a first spreader having a first generally upright shaft rotatably supported on said harvester on a first axis near said discharge opening including a plurality of angularly spaced and radially extending impeller paddles connected to and rotating with said first shaft, said first spreader having vertical open spaces between said impeller paddles and said impeller paddles passing below said discharge opening during rotation,

a second spreader having a second generally upright shaft rotatably supported on said harvester on a second axis spaced laterally from said first axis, a disc coaxially connected to and rotating with the bottom end of said second shaft and a plurality of angularly spaced blades extending generally radially from and connected for rotation with said second shaft, said blades being disposed on top of said disc, a portion of said disc being disposed beneath said discharge opening and said disc and blades being below said impeller paddles whereby a substantial portion of discharged crop material passing between said impeller paddles falls on said disc and

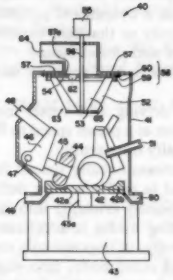
drive means operable to rotate said shafts in opposite directions including first speed adjusting means operable to effect multiple speed operation of said spreaders and second speed adjusting means operable to change the speed of said first spreader relative to said second spreader.

4,684,069

CLASSIFIER AND CONTROLLER FOR VERTICAL MILL

Isao Hashimoto, Akashi; Tosuke Kinoshita; Masahiro Uchida, both of Kobe, and Susumu Uchiyama, Nishinomiya, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Aug. 12, 1985, Ser. No. 764,437
Claims priority, application Japan, Aug. 18, 1984, 59-172291
Int. Cl.[4] B02C *4/28*
U.S. Cl. 241—79.1 **20 Claims**



1. A vertical mill comprising an outer casing, a top plate, means adjacent the lower portion of said casing for pulverizing material, and means producing an upward flow of gas for carrying powdery material upwardly toward said top plate, a classifier comprising

a plurality of rotary means mounted in said casing below said top plate and having a generally vertical axis of rotation;

said rotary means being spaced from said top plate to provide a gap between said rotary means and said top plate;

an annular impingement member suspended below the top plate and outwardly surrounding said plurality of rotary means so as to shield at least a portion of said gap; and

at least one of said impingement member and said top Plate at least in part forming an opening through which said gas and powdery material pass.

4,684,070

SHREDDED TIRE OVERSIZE SCRAP RETURN ELEVATOR

John Dicky, North Tonawanda, N.Y., assignor to Columbus McKinnon Corporation, Amherst, N.Y.

Filed Sep. 20, 1985, Ser. No. 777,968
Int. Cl.[4] B02C *23/12*
U.S. Cl. 241—79.3 **5 Claims**

1. A tire shredding apparatus comprising:

(a) a support frame;

(b) a tire shredder mounted upon said support frame at an upper level thereof for receiving and shredding tires when fed into the inlet thereof;

(c) a shredded tire scrap products classifier mounted on said frame beneath said shredder for receiving and dividing said products into separate streams of undersized and oversized products;

(d) a drum-shaped wheel type elevator mounted on said frame for receiving said stream of oversized products into the lower region thereof for returning said oversized products to said shredder for reprocessing, said elevator comprising:

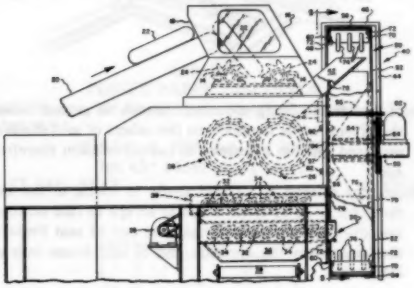
(1) a disc-shaped closed side wall member rotatably mounted by means of a central hub upon a post extending horizontally from said frame;

(2) an annularly shaped rim wall member extending axially from the peripheral portion of said side wall member;

(3) an annular flange wall member extending radially inwardly from said rim wall member in spaced opposition to said side wall member, whereby said elevator includes a closed side wall member and an open side wall member providing an annular trough therebetween for carrying products deposited into a lower portion thereof upwardly to a higher elevation when said elevator is driven to rotate;

(4) a plurality of lift plates transversely disposed at circumferentially spaced apart intervals within said trough to provide scoop-like pockets for carrying products when deposited therein upwardly to an elevation above said shredder when said pockets are in the uprising segment of the elevator when rotating;

(5) chute means extending into the open side of said elevator at the upper region thereof for directing said elevated products to fall by gravity therefrom into the feed inlet of said shredder; and



(6) an oversized products travel control device comprising a trough-shaped channeler stationarily mounted upon said frame in open-facing opposition to the rising segment of said elevator when rotating, and having side walls peripherally configured to complement the curvatures of said rim and flange wall members and being of upwardly convergent sectional area form whereby to be adapted to intake at its open lower end and funnel into increasingly densified condition said products during the elevating process thereof, and terminating in open end form in the upper region of said elevator rotation whereby said oversized products are thereupon released to fall by gravity therefrom by way of said chute means into said shredder for reprocessing.

4,684,071

UNITIZED MACHINE FOR SHREDDING WASTE AUTOMOTIVE VEHICLE TIRES

John Dicky, North Tonawanda, N.Y., assignor to Columbus McKinnon Corporation, Amherst, N.Y.

Filed Oct. 21, 1985, Ser. No. 789,426
Int. Cl.[4] B02C *23/12*
U.S. Cl. 241—80 **15 Claims**

1. A compactly unitized machine for shredding waste automotive vehicle tires and reducing to prescribed maximum sizes the remnants thereof, said machine including:

a shredder mounted upon said machine at an upper level thereof for receiving and shredding tires when fed thereinto;

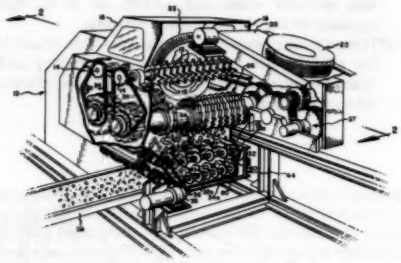
a shredded scrap reciving classifier mounted on said machine beneath said shredder; and

an elevator mounted on said machine for receiving oversize scraps of shredded materials from said classifier and re-

turning said oversize scraps to said shredder for reprocessing, said classifier including:

a vertically open rectangular-shaped frame having opposite side portions thereof formed to support and accommodate in freely rotatable relation the opposite ends of a plurality of parallel horizontally spaced apart drive shafts;

pluralities of spaced apart discs mounted in fixed relation on each of said shafts; the discs on the shaft adjacent one end



of said frame being mounted thereon to extend radially therefrom, while the discs on the others of said shafts are mounted thereon to extend in canted relation therefrom; and

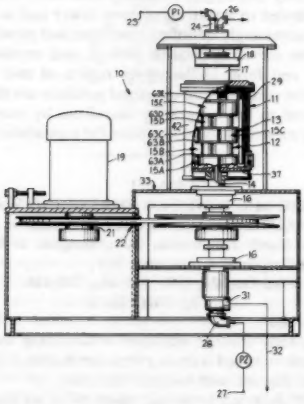
means for driving all of said shafts to rotate in the same direction so as to cause oversize scraps to ride on top of said discs and away from said one end of said frame for discharge over the opposite end of said frame into said elevator.

4,684,072

BLADE FOR CENTRIFUGAL MEDIA MILL

Roy A. Nelson, South Haven, Mich.; Raymond A. Entriken, E. Liverpool, Ohio, and Randolph C. Grieves, Allen Park, Mich., assignors to Epworth Manufacturing Co., Inc., South Haven, Mich.

Filed May 19, 1986, Ser. No. 864,674
Int. Cl.[4] B02C *17/04*
U.S. Cl. 241—172 **7 Claims**



1. A mill for effecting in a particulate-containing substance a reduction in size of said particulate, comprising:

support means;

an elongated vessel means rotatably mounted on said support means about an axis of rotation, and drive means therefor, said vessel means having a generally cylindrical interior;

inlet and outlet means in said vessel means for said particulate-containing substance;

an elongate and generally cylindrical, hollow rotor body extending centrally of said cylindrical interior of said vessel means and along a majority of the length thereof and being fixedly secured to said vessel means, said generally cylindrical rotor body having a diameter substantially less than an inner cylindrical surface of said vessel means to define a space therebetween;

means defining a plurality of cavities disposed in and equally spaced about on a cylindrical peripheral surface of said hollow rotor body so that said cavities each oppose said inner surface of said vessel means;

comminuting media in said space in said vessel means and said cavities;

drive means for driving said vessel means and said rotor body for rotation at a preset speed to fling said comminuting media radially outwardly;

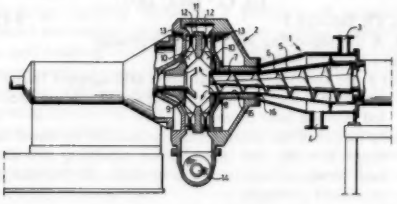
plural deflector means equally spaced from each other and fixedly oriented in said space for deflecting said comminuting media radially inwardly into said cavities whereby said comminuting media is accelerated and again flung radially outwardly, in response to a rotation of said vessel means and said rotor body, into engagement with said fixed deflector means, the sum total of the volumes of all of said cavities in said rotor body having a total volume approximately equal to the total volume of said plural deflector means within said space, all of said cavities further having at least a portion of an internal wall surface which is approximately an inverted image of an external, radially inwardly facing side of each said deflector means, an external radially outwardly facing surface of each said deflector means extending approximately parallel to said inner surface of said vessel means.

4,684,073

APPARATUS FOR THICKENING AND REFINING FIBRE-PULP SUSPENSIONS

Torsten L. Berggren, Nässjö, Sweden, assignor to Thune-Eureka A/S, Lier, Norway

PCT No. PCT/SE84/00416, § 371 Date Oct. 9, 1985, § 102(e) Date Oct. 9, 1985, PCT Pub. No. WO85/03730, PCT Pub. Date Aug. 29, 1985
PCT Filed Dec. 5, 1984, Ser. No. 786,399
Claims priority, application Sweden, Feb. 15, 1984, 8400824
Int. Cl.[4] D21D *1/30*; B02C *7/00*
U.S. Cl. 241—247 **7 Claims**



1. Apparatus for thickening and refining fibre-pulp suspensions, comprising: a screw-press thickener (1) and a disc refiner (2), wherein a screw (6) of the thickener is surroundingly embraced by a screening jacket (5) having at least one section which converges in a feed direction to achieve a necessary compression effect for de-watering a fibre-pulb suspension in the screw-press and to reduce the diameter of the screening jacket, wherein a reduced diameter outfeed end of the screw-press thickener is directly connected to an inlet end of an unrestricted, substantially constant diameter infeed passage (7) of the refiner (2) leading to a central distribution cavity (8)

within discs (12, 13) of the refiner, wherein the screw (6) of the screw-press thickener extends completely through said infeed passage (7) to positively feed the de-watered fibre-pulp suspension directly into the distribution cavity of the refiner, and wherein the screw has an inwardly tapering core within the infeed passage such that the effective cross-sectional area of said passage increases in the feed direction to facilitate the flow of the de-watered fibre-pulp suspension.

4,684,074

FLUID-OPERATED RAM

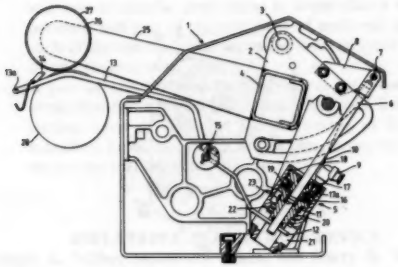
John Whiteley, Clitheroe, England, assignor to Hollingsworth UK Ltd., Accrington, England

Filed Apr. 30, 1986, Ser. No. 857,267

Claims priority, application United Kingdom, May 3, 1985, 8511390

Int. Cl.[4] B65H *54/42, 63/02, 63/08*

U.S. Cl. 242—18 DD **9 Claims**



1. A yarn winder incorporating

winder frame means;

package support means to support a yarn package being wound;

friction drive roll means for rotating a said package;

traverse means for traversing a running yarn laterally to build up said package; and

a fluid power-operated drive ram connected to said package support means and said winder frame means whereby operation of said ram actuates lifting of a wound yarn package away from said friction drive roll means upon application of fluid pressure to the drive ram;

said drive ram comprising:

(a) cylinder means;

(b) piston means slidable in the cylinder means;

(c) piston rod means having a longitudinal axis and extending through one end of the cylinder means and through the piston means;

(d) means for admitting fluid under pressure to said cylinder means;

(e) means for selectively locking the piston rod to one of the piston means and the cylinder means for fluid pressure-operated actuation of relative movement between the piston means and the cylinder means, wherein the means for locking the piston rod means is a locking member carried by said one of the piston means and the cylinder means and having bore means extending therethrough;

(f) means on said piston rod means having a substantially constant cross-section conforming very closely to said bore means to allow sliding of the piston rod means through said bore means when said bore means is coaxial with said piston rod means, said locking member having a first operative position in which the longitudinal axis of said bore means is coaxial with the longitudinal axis of the piston rod means, and a second position in which the longitudinal axis of the bore means is skew relative to that of the piston rod means; and

(g) means carried by said one of the piston means and said cylinder means for driving said locking member into its second position when fluid pressure is applied to the ram, whereby the piston rod means is freely slidable with respect to the other of the piston means and the cylinder means when said locking member is in both said first position and said second position, and the piston rod means is able to slide relative to said locking member unless fluid pressure is being applied to the ram to cause said locking member to move to its second position, whereby the piston rod means may move freely relative to both the piston means and cylinder means of the drive ram when the yarn package is in operative contact with said friction drive roll means.

4,684,075

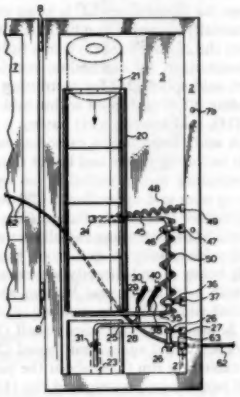
TOILET PAPER DISPENSER

Gilbert Francis, 245 North Street, Stouffville, Ontario, Canada L0H 1L0

Filed Sep. 4, 1986, Ser. No. 904,102

Int. Cl.[4] B65H *16/00, 19/12*

U.S. Cl. 242—55.42 **11 Claims**



1. A paper roll dispenser, comprising:

a housing adapted to be wall mounted, having back and side walls, a floor and a hinged front wall;

a vertically disposed open ended tube adapted to receive a plurality of rolls of paper mounted inside the housing, a bottom end of the tube being laterally spaced from the floor of the housing by a distance greater than the height of a roll of paper, the tube having defined in a side wall thereof a slot spaced from the bottom of the tube by a distance more than the height of a single roll and less than the height of two rolls of paper;

a first lever mounted inside the housing biased to obstruct the bottom end of the tube and pivotal about a vertical axis to clear the bottom of the tube; and

a second lever mounted inside the cabinet, and connected with said first lever and means to bias said second lever to clear the tube, said second lever being pivotal about a vertical axis to enter said slot and bear against a roll in the tube on pivoting of the first lever to clear the bottom of the tube.

4,684,076

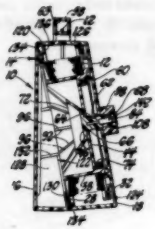
RETRACTABLE CLOTHESLINE DEVICE

James F. Stamper, Nashville, Ind., assignor to Lear Siegler, Inc., Seymour, Ind.

Continuation of Ser. No. 742,031, Jun. 6, 1985, abandoned. This application Aug. 14, 1986, Ser. No. 879,286

Int. Cl.[4] B65H *75/38, 75/48*

U.S. Cl. 242—100.1 **6 Claims**



1. A retractable clothesline device (**10**) for storing a clothesline (**12**) when in a fully retracted position and enabling the clothesline (**12**) to be readily extended from its retracted position for use, said device (**10**) comprising: an outer housing (**14**); a spool (**26**) rotatably mounted within said housing (**14**) for retaining a clothesline (**12**) thereon, said housing (**14**) having an interior space outside of said spool (**26**); biasing means (**72**) operatively connected to said spool (**26**) for being in a biased condition when the clothesline (**12**) is in an extended position and in a substantially unbiased condition relative to the biased condition when the clothesline (**12**) is in a fully retracted position; and characterized by clothesline restricting means directly adjacent said spool (**26**) for restricting said clothesline (**12**) from winding off of said spool within said interior space of said housing (**14**), said housing (**14**) having a front wall (**120**) through which said clothesline is extended and retracted and said spool (**26**) including upper and lower flanges (**28,32**), said clothesline restricting means including an upper shelf (**122**) disposed directly over said upper flange (**28**) and a bottom shelf (**124**) directly below said lower flange (**32**), said upper and bottom shelfs (**122,124**) extending radially outwardly from said flanges (**28,32**) substantially to said front wall (**120**) and said flanges (**28,32**) being seated directly against and in frictional engagement with said upper and bottom shelves (**28,32**) to prevent said clothesline (**12**) from winding off of said spool (**26**) and into said housing (**14**) said upper shelf (**122**) including a shelf portion (**130**) seated against said spool (**26**) and having a downwardly extending rim (**134**) about the periphery thereof, said spool (**26**) being seated within said rim (**134**), said housing (**14**) having an upper wall, said upper shelf (**122**) of said clothesline restricting means including an insert member (**128**) having said shelf portion (**130**) seated against said spool (**26**) and including legs (**132**) extending therefrom engaging said upper wall.

4,684,077

INERTIA RELEASE FOR BELT RETRACTOR WINDING PREVENTION MECHANISM

Gary R. Kurtti, East Detroit; Gregory S. Ches; David T. Brender, both of Mt. Clemens, and John J. Senopole, Utica, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 14, 1985, Ser. No. 798,189

Int. Cl.[4] A62B *35/02;* A65H *75/48*

U.S. Cl. 242—107.6 **3 Claims**

1. A seat belt retractor comprising:

a housing;

a belt reel rotatably mounted on the housing and having a first plurality of circumferentially spaced ratchet teeth facing in the belt winding direction, a second plurality of circumferentially spaced ratchet teeth facing in the belt unwinding direction, and a gear having teeth facing in the unwinding direction;

a windup spring imposing force urging rotation of the reel in the belt winding direction to pull the belt taut against a seat occupant;

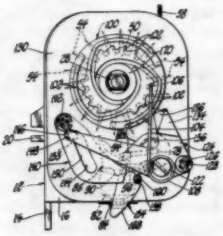
a lock bar mounted on the housing and selectively movable into engagement with the unwinding facing ratchet teeth to lock the reel against belt unwinding rotation;

a winding prevention pawl selectively engageable with the winding facing ratchet teeth to block belt winding rotation by resisting the force imposed by the windup spring so that the belt is held in a slackened condition about the occupant;

a support lever pivotally mounted on the housing;

mounting means mounting the winding prevention pawl on the support lever;

trigger and intermediate means supporting the support lever against movement by force imposed on the lever by the effort of the windup spring when the winding prevention



pawl is engaged with the winding facing ratchet teeth carried by the reel;

inertia sensing means;

a pilot pawl movable into engagement with the gear teeth by the inertia sensing means so that unwinding reel rotation causes further movement of the pilot pawl;

the pilot pawl including engagement means which engage both the lock bar and the trigger and intermediate means to both withdraw the trigger and intermediate means from support of the support lever so that the support lever is shifted relative the housing by the force of the windup spring and move the lock bar into engagement with the unwinding facing ratchet teeth in response to said further movement of the pilot pawl; and

cam means carried by the support lever acting to move the pawl axially out of engagement with the ratchet teeth in response to said shifting movement to enable further belt winding rotation of the reel by the windup spring to pull the belt taut against the seat occupant.

4,684,078

TAPE CASSETTE HAVING A REEL SUPPORT STRUCTURE

Tokuzo Shimizu, Tokyo, Japan, assignor to Teac Corporation, Tokyo, Japan

Continuation of Ser. No. 668,027, Nov. 5, 1984, abandoned. This application Oct. 22, 1986, Ser. No. 921,829

Claims priority, application Japan, Nov. 7, 1983, 58-207595

Int. Cl.[4] B65H *75/18;* G11B *15/32*

U.S. Cl. 242—199 **7 Claims**

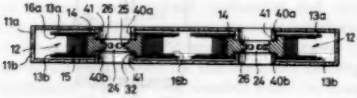
1. A tape cassette comprising:

a pair of reels each having a reel hub around which a magnetic tape is wound, a center hole and reel flanges provided on the reel hub, each of said reel hubs having a pair of stepped parts and a pair of hub surfaces on which said reel flanges are mounted; and

a cassette case for rotatably accommodating the reels, said

cassette case having two holes formed in correspondence with each of said center holes,

said cassette case having a pair of support parts for rotatably supporting the reel hubs of said reels, each of said support parts comprising a pair of annular projections formed on peripheries of the two corresponding holes in the cassette case, each annular projection projecting by a predetermined distance toward the inside of the cassette case and a corresponding one of said reel hubs being supported solely by a tip end thereof, said predetermined distance



having a value such that a distance between the tip ends of said pair of annular projections is larger than a distance between said pair of stepped parts of each reel hub and each of the reel flanges is separated from an inner surface of said cassette case,

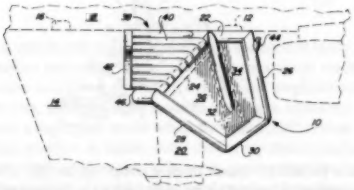
said pair of hub surfaces each having at least one fixing projection and a recess part surrounding said fixing projection, each of said reel flanges having at least one mounting hole into which said fixing projection fits to secure the reel flange to the reel hub.

4,684,079

INFLATABLE EVACUATION DEVICE

Ralph A. Miller, Monmouth Beach, and Harry B. Whitney, Colts Neck, both of N.J., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Dec. 13, 1985, Ser. No. 809,088
Int. Cl.[4] B64D *25/00*
U.S. Cl. 244—137.2 **4 Claims**



1. Inflatable slide apparatus for simultaneous evacuation from two elevated egresses of an aircraft to a lower surface upon which the aircraft is at rest where one egress is located aft of an aircraft wing and the other egress is over the aircraft wing, said apparatus comprising:

a fluid distensible beam structure having a first beam section disposed adjacent the elevated egress aft of the aircraft wing and operably connected to said egress and having a forward end and an aft end, a second beam section extending from the forward end of the first beam section to over the trailing edge of the aircraft wing, three generally parallel longitudinal beam sections, with the first longitudinal beam section extending from the aft end of the first beam section, the second longitudinal beam section extending from the intersection of the first and second beam sections, and the third longitudinal beam section extending from the outward end of the second beam section, all of the parallel longitudinal beam sections extending to the lower surface, and a sixth beam section on the lower surface joining the lower ends of the three longitudinal beam sections;

a first sliding surface extending between the first two of said three longitudinal beam sections from said first beam section to said sixth beam section;

a second sliding surface extending between the second and third of said three longitudinal beam sections from said second beam section to said sixth beam section;

a fluid distensible ramp extending forward from said second beam section on the aircraft wing towards the egress over the aircraft wing; and

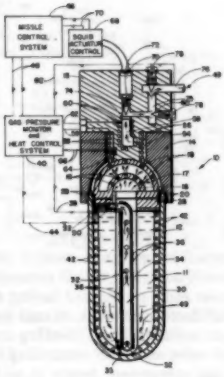
means to deploy the fluid distensible beam structure and ramp from the egress aft of the aircraft wing.

4,684,080

PRESSURE GAS SUPPLY FOR A MISSILE AND THE LIKE

George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.

Filed Jun. 6, 1985, Ser. No. 741,856
Int. Cl.[4] F42B *15/033*
U.S. Cl. 244—3.22 **10 Claims**



1. A high pressure gas supply system under the control of a missile control system, the supply system comprising:

a pressure vessel for storing a liquid, under pressure, therein;

a first means for heating the liquid in the vessel;

a vaporizing chamber attached to the vessel for receiving the heated liquid and gas therefrom;

a second means for superheating the gas as it is received from the vaporizing chamber into a vapor heating chamber;

a gas outlet communicating with the vapor heating chamber for receiving the heated gas therefrom, the gas outlet having a seal therein; and

means for cutting the seal and allowing the gas to be discharged from the supply system when a predetermined pressure is reached.

4,684,081

MULTIFUNCTION POWER SYSTEM FOR AN AIRCRAFT

Michael J. Cronin, Sherman Oaks, Calif., assignor to Lockheed Corporation, Calabasas, Calif.

Filed Jun. 11, 1986, Ser. No. 873,026
Int. Cl.[4] B64D *41/00*
U.S. Cl. 244—58 **10 Claims**

1. A multifunction power system for an aircraft, the aircraft having at least one engine and at least one compartment requiring conditioned air, the system comprising:

a drive shaft;

a compressor means coupled to said drive shaft, said compressor means having an inlet coupled to the exterior of the aircraft and an outlet;

a first turbine coupled to said drive shaft for driving said compressor means;

an electric motor coupled to said drive shaft;

a starter-generator coupled to said drive shaft;

a first duct assembly having a first end coupled to said outlet of said compressor means and a bifurcated second end with one leg thereof coupled overboard and a second leg thereof coupled to said at least one compartment, said first duct assembly mounting a first outside air-cooled heat exchanger means, a first combustor, and a second turbine in series, and further mounting a second outside air-cooled heat exchanger means in said second leg;

a second duct assembly having a first end coupled to said outlet of said compressor means and a bifurcated second end with a first leg thereof coupled to said first duct assembly and a second leg thereof coupled overboard, said second duct assembly coupling a second combustor and said first turbine in series;

a third duct assembly having a first end coupled to said compartment and a second end having a first leg coupled to said first duct assembly, a second leg coupled to said second duct assembly, and a third leg coupled overboard;

a first control valve means for controlling the flow from said outlet of said compressor means to said first and second duct assemblies;

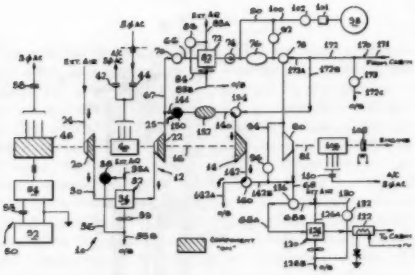
a second control valve means mounted in said first duct assembly for controlling the flow to and between said first and second legs thereof;

a third control valve means coupled to said second duct assembly for controlling flow to and between said first and second legs thereof;

a fourth control valve means for controlling the flow in said first duct assembly and from said first leg of said third duct assembly;

a fifth control valve means for controlling the flow in said second duct assembly and from said second leg of said third duct assembly; and

a sixth control valve means for controlling the flow in said third leg of said third duct assembly.



4,684,082

PARACHUTE SUSPENSION LINE ATTACHMENT STRUCTURE

William L. B. Gargano, 1516 Drexel Dr., Davis, Calif. 95616

Filed Jul. 26, 1985, Ser. No. 759,455

Int. Cl.[4] B64D *17/02*

U.S. Cl. 244—142 **9 Claims**

1. In combination with an inflatable parachute having upper and lower fabric canopies connected by a plurality of airfoil-shaped fabric ribs and a plurality of suspension lines, a structure for attaching each of the suspension lines to a corresponding one of the ribs, comprising:

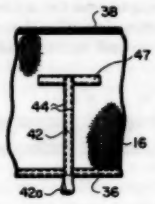
a primary reinforcing tape;

means for securing the primary reinforcing tape in overlapping relationship with a corresponding rib;

the primary reinforcing tape extending vertically across the rib and having an upper end which terminates below the upper canopy;

means for attaching a suspension line to a lower end of the primary reinforcing tape;

a secondary reinforcing tape connected to the upper end of the primary reinforcing tape, the secondary reinforcing tape having an upper end which terminates below and is spaced from the upper canopy; and



means for securing the secondary reinforcing tape in overlapping relationship with the rib below the upper canopy and spaced therefrom for distributing a load on the suspension line across the rib to thereby inhibit the formation of puckers in the upper canopy when inflated.

4,684,083

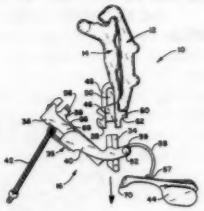
PARACHUTE QUICK RELEASE COUPLING

John D. Maziarz, Middletown, Conn., assignor to Capewell Components Company Limited Partnership, Hartford, Conn.

Filed Apr. 1, 1986, Ser. No. 846,948

Int. Cl.[4] B64D *17/32*

U.S. Cl. 244—151 A **6 Claims**



1. In a parachute quick release coupling having a base coupling member adapted to be attached to a parachute harness and a separate outer coupling member adapted to be attached to a parachute canopy riser, the base and outer members, when coupled together, having lower portions in cooperative relationship and upper portions interlocking to permit releasing the coupling by releasing said cooperative relationship; and a latching mechanism having a latch shiftable between an upper latching position thereof latching said lower portions in said cooperative relationship and a lower release position thereof releasing said cooperative relationship, the base member having guide means for guiding the latch between its said upper and lower positions, a lever mechanism having transversely spaced arms with an interfitting relationship with the latch and pivotal about a transverse axis at the lower end thereof to shift the latch downwardly to its lower position by pivotal movement of the lever mechanism outwardly and downwardly from an operating position thereof overlying the outer member, a lanyard connected to the lever mechanism for pivoting the lever mechanism outwardly and downwardly with the lanyard to release the coupling, a protective cover having a lower edge portion pivotal on the base member to pivot the cover to a closed position thereof overlying the lanyard and lever mechanism, a pivot pin interconnecting the transversely spaced arms

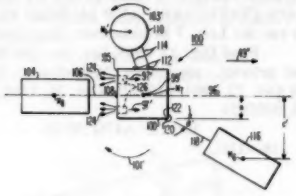
of the lever mechanism and providing said transverse pivotal axis of the lever mechanism, and a resilient strap having a lower end portion at least partly surrounding the pivot pin and an upper end portion connected to the cover above its said lower edge portion and providing an overcenter resilient bias for retaining the cover on its said closed position, the improvement wherein the lever mechanism has a transverse pivot bearing underlying the base member at the lower end thereof and wherein the base member has, adjacent its lower end, a concave, transverse bearing surface providing a bearing engageable by the pivot bearing to pivotally support the latching mechanism in the operating position thereof on the base member against upward and outward movement and opening downwardly and inwardly to permit downward withdrawal of the pivot bearing and therefore downward withdrawal of the latching mechanism to provide for automatically ejecting the latching mechanism from the base member when the coupling is released by pivoting the lever mechanism outwardly and downwardly from its operating position with the lanyard.

4,684,084

SPACECRAFT STRUCTURE WITH SYMMETRICAL MASS CENTER AND ASYMMETRICAL DEPLOYABLE APPENDAGES

William V. Fuldner, Lower Makefield Township, Morrisville County, Pa., and Eugene R. Ganssle, Skillman, N.J., assignors to RCA Corporation, Princeton, N.J.

Filed May 29, 1984, Ser. No. 614,618
Int. Cl.⁴ B64G 1/24
U.S. Cl. 244—168 **7 Claims**



1. In a spacecraft system including a spacecraft body, engine drive means including station keeping means for maintaining said system in a given operating orientation, payload and operating means, a deployable antenna having a retracted launch mode and a deployed mode when the spacecraft system is in an operating position in space, solar cell array means including at least one deployable solar cell array, said array having a retracted launch mode and a deployed mode when the system is in its operating position, the mass center of said spacecraft including all said means when in the launch mode having a given first location relative to said body, said mass center tending to relocate to a second undesirable location upon deployment of said antenna and said solar array, the improvement therein comprising means for deploying said at least one solar cell array to an orientation which locates the mass center of said deployed, operating spacecraft system substantially symmetrically relative to forces applied to said system in a given direction when in said operating position.

4,684,085

AIRCRAFT AUTOMATIC TRIM SYSTEM

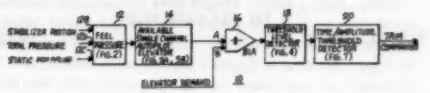
James W. Berwick, Jr., Seattle, and Gary C. Thomason, Auburn, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 31, 1985, Ser. No. 793,615
Int. Cl.⁴ G05D 1/10
U.S. Cl. 244—178 **10 Claims**

1. An aircraft automatic trim system for producing control signals to transfer trim from the aircraft's elevators to the stabilizers during an automatic aircraft flight control mode, the system comprising:

available elevator control means for producing a signal representative of the available elevator control in said automatic flight control mode;

elevator demand means for producing a signal representative of actual elevator demand;



ratio means for producing a ratio signal representative of the ratio of said elevator demand signal to said available elevator control signal; and

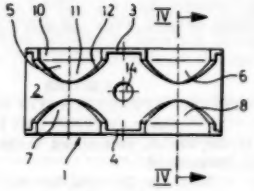
detector means for producing predetermined stabilizer trim command signals in response to said ratio signal.

4,684,086

PIPE SADDLE

Rudolf Fetsch, St. Ingbert, Fed. Rep. of Germany, assignor to Unima Maschinenbau GmbH, Sulzbach-Neuweiler, Fed. Rep. of Germany

Filed Apr. 11, 1986, Ser. No. 850,559
Int. Cl.⁴ F16L 3/22
U.S. Cl. 248—68.1 **9 Claims**



1. A pipe saddle, comprising:

upper and lower saddle halves, each of said saddle halves including

an essentially U-shaped cross section with two side pieces connected by a base piece,

semi-circular recesses in said side pieces for receiving tubular objects, said recesses defining recess axes and having peripheries, and

at least one partially cylindrical support part bent inwardly from one of said side pieces adjacent one of said recesses, defining at least a portion of the respective recess periphery and extending parallel to the respective recess axis for supporting tubular objects, said support part being considerably longer in sections thereof adjacent said base piece than in sections thereof remote from said base piece, said support part having an edge in a shape corresponding to a border line of a simple geometric figure; and

connection means for releasably coupling said saddle halves.

4,684,087

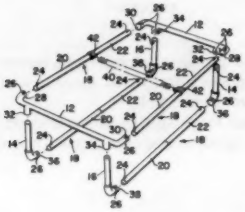
GROCERY BAG HOLDER AND KIT FOR THE ASSEMBLY THEREOF

Gerald V. Spickard, 311 E. Northfield Blvd., Murfreesboro, Tenn. 37130

Continuation-in-part of Ser. No. 841,554, Mar. 20, 1986, abandoned, which is a continuation-in-part of Ser. No. 763,336, Aug. 6, 1985, abandoned. This application Aug. 18, 1986, Ser. No. 897,587

Int. Cl.[4] A63B *55/04*

U.S. Cl. 248—97 **10 Claims**



1. Components for assembly of a frame for receiving grocery bags without the use of separate fasteners, comprising

two lower single piece rails,

two upper single piece rails,

four single piece corner members, and

two single piece cross members, each cross member having integral right angle end poritons for connecting to the two upper rails, and two integral downwardly directed portions for connecting respectively to the four corner members, said downwardly facing portions being located inwardly of the right angle end portions, and

the four corner members having integral right angle end portions for connecting to the ends of the lower rails,

with the connections between the members comprising an end of one member including a key insertable into a hollow portion of the other member which includes a keyway, wherein the keys may be rotated relative to the keyways to connect the members together.

4,684,088

SUPPORT APPARATUS FOR AN OPTICAL OBSERVATION DEVICE

Rudolf Heller, Zürich, Switzerland, assignor to Contraves AG, Zürich, Switzerland

Filed Apr. 25, 1986, Ser. No. 855,918

Claims priority, application Switzerland, May 13, 1985, 2032/85

Int. Cl.[4] A47G *29/00*

U.S. Cl. 248—123.1 **10 Claims**

1. A support apparatus for adjustably positioning a device, comprising:

a stand component;

an arm component extending transversely relative to said stand component and having a free end region at which there is capable of being arranged the device;

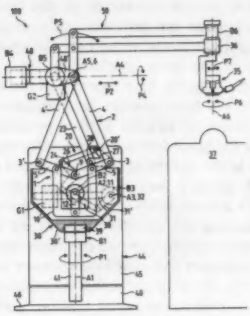
a pivotable guide linkage cooperating with said stand component for adjusting the device in a direction transverse to said stand component;

said pivotable guide linkage comprising a joint and a structure upwardly directed from said joint and having an upper end;

said arm component being arranged at said upper end of said pivotable guide linkage;

said upwardly directed structure of said guide linkage comprising a carrier linkage having a variable length; and

said pivotable guide linkage further comprising a control linkage which is positioned below and in coacting relationship with said carrier linkage for varying said variable



length of said carrier linkage as a function of its movement.

4,684,089

COMPUTER WITH UNIVERSAL INPUT MEMBER FOR USE ON STATIONARY AND MOBILE PLATFORMS

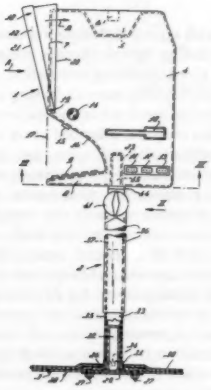
Cornelis van der Lely, 7 Brüschenrain, Zug, Switzerland

Filed Oct. 22, 1985, Ser. No. 790,301

Claims priority, application Netherlands, Oct. 22, 1984, 8403202; Oct. 22, 1984, 8403201; Dec. 24, 1984, 8403925; Dec. 24, 1984, 8403924

Int. Cl.[4] A47G *29/00*

U.S. Cl. 248—124 **25 Claims**



12. A computer of a type which is portable and easily transportable by a person or normal physique comprising a housing which is constructed so that the computer can be operated while supported on a table and can also be mounted with facility in the cab of a vehicle, handle means for enabling said person to lift and carry the computer, a screen, a keyboard for operating the computer, said keyboard being attached in said housing lower than the screen and at least partly behind a plane extending upwardly through said screen and substantially coinciding throughout with the general plane of said screen.

4,684,090

TRANSPORTABLE SEATING DEVICE

Henrik Skarland, St. Olavsgate 3, 0165 Oslo 1, Norway

Filed May 5, 1986, Ser. No. 859,392
Int. Cl.[4] A45D *19/04*
U.S. Cl. 248—155 22 Claims

1. A transportable seating device comprising: a shaft normally oriented in an essentially vertical direction with respect to a supporting surface while in use; an arm mounted in said shaft intermediate the length thereof for rotation about the longitudinal axis of said arm; and a seat mounted on said arm and rotatable from a position substantially parallel to said shaft to a position substantially perpendicular to said shaft.

4,684,091

PORTABLE MUSICAL INSTRUMENT STAND

Giovanni Moreschi, Recanata, Italy, assignor to Latin Percussion, Inc., Garfield, N.J.

Filed Mar. 18, 1986, Ser. No. 840,769
Int. Cl.[1] A47B *97/04*; F16M *11/38*
U.S. Cl. 248—166 5 Claims

1. A portable and foldable stand for musical instruments, comprising:

a pair of spaced apart parallel tubular main legs;

a pair of brace legs each having one end pivotally attached to each of said main legs;

a pair of brace arms each releasably coupled to each of said main legs and said brace legs adjacent their opposite end for maintaining said brace legs in an open position with respect to said main legs;

latch means for releseably attaching each of said brace arms to each of said main legs;

pivot means joined to the end of each of said main legs;

at least one cross member for receiving and supporting said musical instruments,

releasable clamping means disposed on each end of said at least one cross member comprising a split ring collar having two jaws, one of which includes a threaded shank and the other having a wing screw engaged into said threaded shank for releasably clamping said cross member to each main leg, said clamping means releasably clampable and slidable on each of said main legs, thereby linking said pair of main legs so that the stand may be placed into the erected position by attaching each of said brace arms to each of main legs with said latch means and by positioning and securing each clamping means at each end of of said at least one cross member on each main leg or over said pivot means thereby providing a rigid connection between said parallel main legs to create a stable stand;

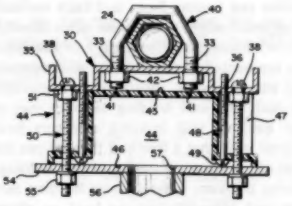
a tubular upper leg segment joined to each of said pivot means and having a diameter substiantially similar to each of said tubular main leg and a length at least the length of said split ring collar, so that the stand may be folded by detaching said brace arms from said main legs, releasing said clamping means on said cross member, sliding said clamping means of said cross member off of each of said main legs and said pivot means onto said upper leg segment, and folding said main leg of each support toward said cross member.

4,684,092

CEILING FAN MOUNTING ASSEMBLY

Kenneth H. Reiker, 22 Lakeshore Dr., Shalimar, Fla. 32579

Filed Oct. 8, 1985, Ser. No. 785,405
Int. Cl.[4] F24F *7/06*
U.S. Cl. 248—200.1 16 Claims



1. A ceiling fan mounting assembly for providing a high load capability, vibration resistant, and torque resistant connection through a ceiling opening between an electrical ceiling fan support housing and a joist structure adjacent the opening, comprising:

(a) hanger bracket assembly means engaging the joist structure and providing rigid support between the joist structure and a ceiling fan assembly support housing,

(b) the hanger bracket assembly means including two widely spaced downwardly extending support elements rigidly supported at their upper end, which extend through a ceiling opening and directly support the ceiling fan support housing,

(c) an electrical junction box having a relatively flat upper surface and a lower peripheral surface, positioned immediately below the hanger bracket assembly means with at least two diametrically opposed sections of said upper surface rigidly engaging the hanger bracket assembly means,

(d) a ceiling fan support housing having a structural member which is disposed directly below and in firm engagement with the lower surface of the junction box,

(e) a ceiling fan support housing structural member having retaining sections with openings therein,

(f) said support elements extending along the outside of the internal periphery of the junction box and through the openings of the retaining sections,

(g) fastening means for engaging the lower end of the downwardly extending elongated support elements for holding the ceiling fan support housing in firm contact against the junction box whereby the junction box is pressed into firm engagement against the hanger bracket assembly means

and acts as a firm intermediate support element for the ceiling fan assembly support housing.

4,684,093

FIXATION DEVICE FOR ELECTRONIC DISPLAY

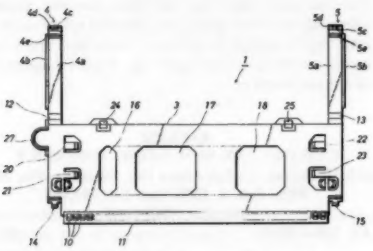
Masaru Yagi, Tsushima, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan

Filed Apr. 30, 1986, Ser. No. 857,260

Claims priority, application Japan, Jul. 24, 1985, 60-114150[U]

Int. Cl.⁴ F16M *11/00*

U.S. Cl. 248—201 **10 Claims**



1. An electronic display fixation device comprising:

a plate-like rest having front and back surfaces and having two opposed edges at opposite sides thereof;

at least two holding members, each of said holding members being connected to only one of said opposed edges by a hinge and extending substantially transverse to said one edge such that said holding member may pivot via said hinge, each of said holding members having a length sufficient such that a free end thereof can reach the other of said edges upon a pivoting of said holding member to a retaining position, whereby said holding member extends across said plate-like rest to hold an electronic display mounted on the front surface thereof;

engaging means, formed only on the other of said opposing edges at positions corresponding to said free ends of said holding members in said retaining position, for engaging and holding said free ends; and

fixing means extending from said back surface for fixing said device to a circuit board.

4,684,094

ADJUSTABLE BRACKET ASSEMBLY

Lynn E. Everett, New Philadelphia, Ohio, assignor to Tusco Manufacturing Co., Gnadenhutten, Ohio

Continuation of Ser. No. 648,829, Sep. 10, 1984, abandoned. This application Apr. 23, 1986, Ser. No. 857,523

Int. Cl.⁴ A47F *5/00*

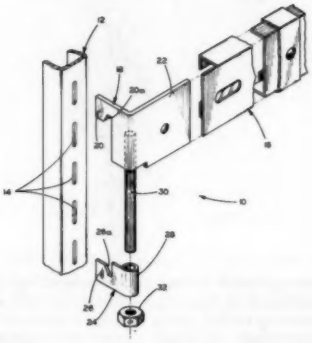
U.S. Cl. 248—245 **1 Claim**

1. An adjustable bracket assembly for attachment to an elongate support member having a longitudinal axis and at least a pair of longitudinally spaced slots, comprising:

(a) a first generally L-shaped plate member having a first leg located in a plane generally parallel to the longitudinal axis of the support member and provided with a tapered notched tab portion insertable in one slot of the pair of slots, said first plate member having a second leg angularly disposed relative to said first leg and adapted to be secured to an assembly to be supported relative to the elongate support member;

(b) a second plate member longitudinally spaced from said first plate member and having one end formed to define a generally cylindrical, longitudinally extending sleeve and a second end extending generally tangentially from said sleeve and located in said plane, said second end provided with a tapered notched tab portion in facing relationship with said tab portion of said first plate member and insertable in a second one of the pair of slots;

(c) longitudinally extending threaded stud means fixedly attached to one side of said first leg of said first plate member and passing through said sleeve of said second plate member; and



(d) nut means threaded on said stud means adjacent said second plate member for moving said first and second plate members toward each other whereby the notched tab portions of said first and said second plate members cooperate with opposite sides of their respective slots to detachably secure said plate members to the elongate support member.

4,684,095

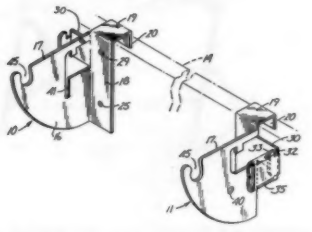
CURTAIN ROD AND WINDOW SHADE HOLDER

Wilber J. Athey, Rte. 1, Box 39, Clinton, Minn. 56225

Filed May 2, 1986, Ser. No. 858,668

Int. Cl.⁴ A47H *1/14*

U.S. Cl. 248—255 **6 Claims**



1. A curtain rod and window shade holder comprising:

a sheet of rigid material having a main portion bounded by an arcuate lower edge, a flat upper edge and a narrow rear portion extending the full height of said main portion and projecting upwardly therefrom, said arcuate lower edge extending from the lower end of the narrow rear portion to the outer end of the flat upper edge, said narrow rear portion being bent perpendicularly with respect to the plane of the main portion to engage a window frame and having the upwardly projecting portion thereof bent backwardly and then bent downwardly to provide a hook portion to engage over the top of a window frame and extend downwardly between the frame and the wall to which the frame is attached; and

said sheet having a curtain rod holding portion struck outwardly from an intermediate part of the main portion to leave an opening through said main portion, the outer part of said struck out portion being bent again so as to extend

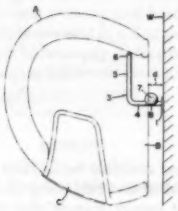
outwardly parallel to the main portion and being cut to provide a hook member to receive the end of a conventional curtain rod of the channeled type.

4,684,096

MOUNTING DEVICE FOR HELMET

Akira Tanaka, No. 11-14-2A, Fukasawa 7-Chome, Setagaya-ku, Tokyo, Japan

Filed May 29, 1986, Ser. No. 867,957
Claims priority, application Japan, Jul. 4, 1985, 60-101278[U]
Int. Cl.[4] A47H *1/10*
U.S. Cl. 248—309.1 **4 Claims**



1. A hanger for a motorcycle helmet that has a dome-like body wherein there is an opening through which a wearer's head enters the body and which is surrounded by an edge on the body, said hanger comprising a substantially L-shaped hook member having connected horizontal and vertical portions and means on a rear end of said horizontal portion for securing said hook member to an upright wall with said horizontal portion projecting forward from the wall and said vertical portion projecting upward from the horizontal portion in forwardly spaced relation to the wall to have its top supportingly engageable by an inner surface portion of the body of a helmet, near said edge thereon, said hanger being characterized by:

bar-like stop means projecting in opposite lateral directions from said hook member and having remote end portions which

(1) are spaced apart by a distance greater than the distance across said opening in a helmet body,

(2) are in downwardly offset relation to the top of said vertical portion, and

(3) are in forwardly offset relation to said rear end of the horizontal portion,

for engagement by laterally opposite portions of said edge on a helmet body to hold the same so spaced from a wall to which the hanger is secured that a person's hand can be inserted between the wall and the helmet for grasping the latter.

4,684,097

MOBILE HOME STANCHIONS

Roger W. Cox, 7690 Jacinto Rd., Elk Grove, Calif. 95624

Filed Apr. 14, 1986, Ser. No. 851,822
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—354.3 **10 Claims**

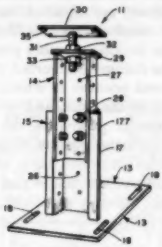
1. A stanchion for a mobile home or the like comprising:

(a) a base which is laterally adjustable,

(b) a vertically adjustable telescopic vertical support having an upper end and a lower end,

(c) an upper mobile home support adjustably mounted at the upper end of said vertical support, said upper mobile home support having mobile home connecting means thereon, which means is adapted to be mounted on the underside of the mobile home,

wherein said vertically adjustable support includes an intermediate U-shaped section secured to said base and a slightly narrower U-shaped inner channel, each of the intermediate U-shaped section and inner channel having two series of vertically aligned spaced apertures, disposed in a normal relationship on at least two adjacent surfaces of the U-shaped inner channel and the U-shaped section



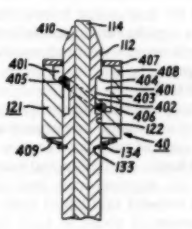
for receiving bolts therein to secure said section and channel in a fixed position to thereby vary the height of said stanchion.

4,684,098

SUPPORT COLUMN WITH GRAVITY RETENTION MEANS

Lee T. Lamond, North Wales, Pa., and Richard D. Staton, Collingswood, N.J., assignors to Fichtel & Sachs Industries, Colmar, Pa.

Division of Ser. No. 730,796, May 6, 1985, Pat. No. 4,640,484.
This application Nov. 20, 1986, Ser. No. 933,230
Int. Cl.[4] F16M *11/28*
U.S. Cl. 248—407 **8 Claims**



1. An adjustable-length support column comprising:

(a) a first tubular member for connecting to a surface to be supported;

(b) a second tubular member for connecting to a base for the surface, one of the tubular members being telescopically received within the other;

(c) pneumatic spring means located within the first and second tubular members comprising:

(1) a cylinder member,

(2) a piston rod member axially movable within the cylinder member and having a first annular groove in an outwardly extending portion thereof, and

(3) means for permitting adjustment of the axial position of the piston rod member relative to the cylinder member and thereby of the length of the support column;

(d) means for operatively coupling the piston rod member to the first tubular member in load-transmitting relationship thereto;

(e) means for operatively coupling the cylinder member to the second tubular member in load-transmitting relationship thereto; and

(f) means for releasably locking the piston rod member within the first tubular member comprising:

(1) a lock body retained within the first tubular member and having a bore with the piston rod member slidably

disposed therein, the lock body having one or more cavities communicating with the bore,

(2) a locking member pivotally disposed within each cavity, such that, when the column is upright and the inner ends of the cavity are adjacent the firt annular groove, each locking member falls to a first position in which a portion of the locking member protrudes into the bore and, when the column is inverted, each locking member falls to a second position in which the locking member is retracted from the bore, and

(3) the first, annular groove in the piston rod member cooperating with the portion of each locking member that proturudes into the bore of the lock body to achieve locking of the piston rod member to the lock body when the column is upright.

4,684,099

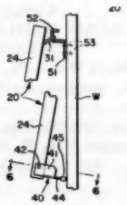
PIVOTALLY MOUNTED SCHEDULING BOARDS

Wallace A. Krapf, 1933 O'Neill Rd., Macedon, N.Y. 14502

Filed Oct. 6, 1986, Ser. No. 916,205

Int. Cl.[4] A47B *97/00*

U.S. Cl. 248—447.1 **15 Claims**



1. Apparatus for suspending from a vertical wall a scheduling board of the type having a generally rectangularly shaped, multi-layer panel section secured around its periphery in a rigid frame, comprising

a plurality of bails,

means mounting said bails on one side of said panel section to swing about a common axis extending adjacent and parallel to one edge of said panel section,

a plurality of hooks secured to and extending from said wall releasably to register with and engage in said bails, thereby to suspend said board from said wall for limited pivotal movement about at least said common axis between a collapsed position in which the lower edge of said board remote from said one edge of said panel section is in proximate engagement with said wall, and an inclined position in which said lower edge of said board is spaced from said wall a distance greater than the upper edge thereof, and

a plurality of support arms pivotally mounted each adjacent on end thereof on said frame adjacent said lower edge of the board for limited swinging movement between folded positions in which said arms are located adjacent and parallel to said panel section, when the board is in its collapsed position, and unfolded positions in which said arms extend tranverse to said panel section to have the opposite ends thereof engage said wall to hold the board in its inclined position.

4,684,100

SPRUNG VEHICLE SEAT

Johann Grassl, Schwandorf, Fed. Rep. of Germany, assignor to Grammer Sitzsysteme GmbH, Amberg, Fed. Rep. of Germany

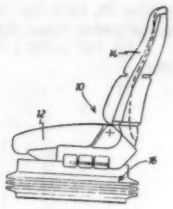
Filed Apr. 24, 1986, Ser. No. 855,476

Claims priority, application Fed. Rep. of Germany, May 15, 1985, 3517504

Int. Cl.[4] F16M *13/00*

U.S. Cl. 248—550 **2 Claims**

1. A sprung vehicle seat comprising: a base frame; a seat carrier frame displaceable relative thereto; a fluid spring operatively disposed between the base frame and the seat carrier frame; a control means for controlling the fluid spring, said control means, for varying the pressure in said fluid spring, including a switching means and an actuator means adapted to act on said switching means; a belt winding mechanism disposed on one of said base and seat carrier frames and including a belt having first and second ends, the first end of said belt



being secured to and windable on said belt winding mechanism and the second end of said belt being secured to the other of said base and seat carrier frames, said control means being co-operable with said belt winding mechanism to produce relative rotary movement as between said switching means and said actuator in response to movement in respect of height of said seat carrier frame relative to said base frame.

4,684,101

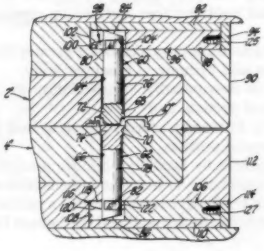
QUICK CHANGE MOLD INSERT

Earl F. Wagner, Alexandria, and Charles M. Smith, Anderson, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 737,730, May 28, 1985, abandoned. This application Nov. 4, 1985, Ser. No. 794,589

Int. Cl.[4] B29C *39/26, 45/26*

U.S. Cl. 249—144 **1 Claim**



1. A mold adapted for mounting in an injection molding machine comprising:

first and second relatively movable mold members coacting in a mold-closed position to define a molding cavity for shaping a molded article, at least one of said members having a sidewall which is readily accessible to a machine operator from the exterior of the mold without removing the mold from the machine;

a socket in said one mold member opening into said cavity, said socket having a mouth portion contiguous said cavity which is wider than the remainder of the socket and defines a seat receiving the head of a mold insert;

a replaceable mold insert in said socket for changing the mold cavity detail as desired;

a molding head on one end of said insert having a shape complementary to said seat, said head being nested in said seat and in-part defining said cavity;

a shank extending from said head into the remainder of said socket, said shank having a girth less than said head;

a camming surface on the end of said shank opposite said head for dislodging said insert from said socket when engaged by an appropriate tool;

at least one mortice in said shank proximate said camming surface said mortice being defined in part by an anchoring surface;

a passage in said one member extending between said socket and said sidewall and providing access to said mortice and camming surfaces; and

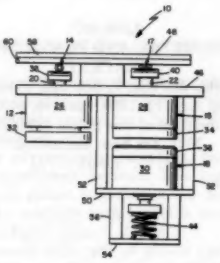
an invertible retaining pin slidable within said access passage to secure said molding head fixedly within said seat throughout a plurality of successive molding cycles, said pin having a wedging surface thereon for engaging said anchoring surface and drawing said head tightly into said seat when said pin is oriented in a first position and subsequently engaging said camming surface for dislodging said insert from said socket when said pin is inverted relative to said first position.

4,684,102

PINCH VALVE

Raymond C. Dykstra, Boulder, Colo., assignor to Cobe Laboratories, Inc., Lakewood, Colo.

Filed Oct. 10, 1986, Ser. No. 917,795
Int. Cl.[4] F16L *55/14*
U.S. Cl. 251—7 **9 Claims**



1. A pinch valve comprising

a fixed member,

a flexible tube adjacent said fixed member,

a first linear solenoid having a housing fixedly mounted with respect to said fixed member and a first movable member that is movable between a first, powered position and a second unpowered position,

said first member carrying a nose on the other side of said tube from said fixed member, said nose occluding said flexible tube when in said first position and not occluding said tube when in said second position,

said first solenoid having a second movable member that is fixedly connected with respect to said first movable member to move with it,

a second linear solenoid having a housing fixedly mounted with respect to said housing of said first solenoid and a third movable member that is movable between first and second positions so as to push said second member and to cause said first member to be pushed to said first position when said third member moves from said second position to said first position,

said second linear solenoid including a fourth movable member that is fixedly connected with respect to said third movable member to move with it, and

a spring tending to push said fourth member so that said third member pushes said second member and said first member to said first position,

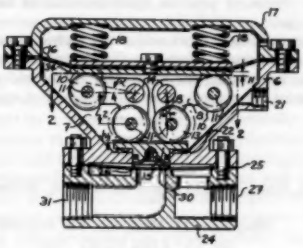
said second linear solenoid being activatable to overcome the force of said spring and to put said third member into said second position when activated.

4,684,103

LEVER-AMPLIFIED ACTUATING MEANS FOR VALVES AND OTHER DEVICES

Hans D. Baumann, 32 Pine St., Rye, N.H. 03870

Filed Aug. 25, 1986, Ser. No. 900,323
Int. Cl.[4] F16K *31/165, 7/16, 31/44*
U.S. Cl. 251—58 **4 Claims**



1. Lever-amplified actuating means for valves and other devices comprising:

a. one pair of toggle elements mounted in spaced relationship within a housing having a central opening, each of said toggle elements pivotably supported by shaft means which are suitably retained within a said housing;

b. each of said toggle elements comprising at least one upper bearing suitably supported essentially level to said shaft means, and at least one lower bearing suitably rotatably supported below said shaft means;

c. displacement means mounted within the lower portion of said central opening of said housing and being engaged to said lower bearings;

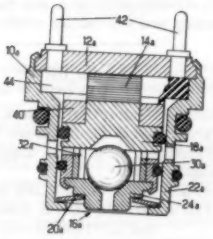
d. plate means mounted within the upper portion of the housing opening having a flat lower surface being subjected to rolling motion of the upper bearings and capable of engaging and displacing said upper bearings down and thereby pivoting said pair of toggle elements around said shaft means, said pivoting motion further causing said lower bearings to extend their co-sinusidal distance with respect to the supporting shaft means and thereby causing a downward motion of said displacement means.

4,684,104

ELECTRICALLY CONTROLLED VALVE WITH PIEZOELECTRIC EFFECT

Guy Micard, Montesson, France, assignor to Solex and Regie Nationale des Uines Renault, France

Filed Jul. 8, 1985, Ser. No. 752,511
Claims priority, application France, Jul. 6, 1984, 84 10834
Int. Cl.[4] F16K *31/08;* F02M *27/08*
U.S. Cl. 251—129.05 **7 Claims**



1. Electrically connected valve comprising:

a casing defining a fluid passage surrounded by a valve seat,

a closure member in said casing movable between a first

abutment position and a second abutment position with respect to said valve seat,

piezoelectric means arranged for exerting on said closure member a percussion force for throwing said closure member from the first abutment position to the second abutment position upon application of an electrical voltage to said piezoelectric means and for throwing said closure member from the second abutment position to the first abutment position upon removal of said electrical voltage,

and means distinct from said piezoelectric means for retaining said closure member in the abutment positions with a force lower than the force exerted by said piezoelectric element upon application and removal of said voltage.

4,684,105

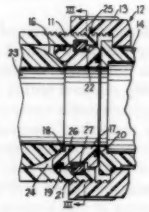
BALL VALVE

Carroll J. Haas, II, 6215 Bravo Ct. Apt. 2A, Kalamazoo, Mich. 49002

Filed Nov. 21, 1985, Ser. No. 800,480

Int. Cl.[4] F16K *25/00, 5/06*

U.S. Cl. 251—150 **7 Claims**



1. In a ball valve comprising a valve body having an axially extending bore, a rotatable valve ball in said bore, annular sealing ring surfaces disposed in said bore for sealingly engaging opposite axial sides of said ball, at least one of said annular sealing ring surfaces being provided on the axially inner end of an annular seal carrier which is removably disposed within said bore adjacent to one axial end of said valve body, the improvement which comprises: said seal carrier has a circumferentially extending recess in the peripheral surface thereof, said circumferentially extending recess being located between and spaced from the opposite axial ends of said seal carrier; said valve body having a circumferentially extending groove in the radially inner surface thereof, said circumferentially extending groove being spaced from said one axial end of said valve body and being disposed in alignment with said circumferentially extending recess so that said groove and recess mate and define a continuous circumferentially extending passageway, said valve body having an insertion slot extending radially outwardly from said circumferentially extending groove through the exterior surface of said valve body; and

a radially split, solid, flexible, annular, locking ring circumferentially slidably received in said passageway for releasably retaining said seal carrier within said valve body.

4,684,106

VALVE

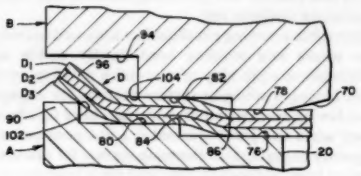
Terrence J. Kolenc, Mentor; Carl R. Bork, Jr., Euclid; William C. Steiss, Parma; Earl D. Shufflebarger, Mentor, and William P. Tobbe, Lyndhurst, all of Ohio, assignors to Nupro Company, Willoughby, Ohio

Continuation-in-part of Ser. No. 482,218, Apr. 5, 1983, Pat. No. 4,606,374. This application Mar. 3, 1986, Ser. No. 835,774

Int. Cl.[4] F16K *31/50*

U.S. Cl. 251—335.2 **11 Claims**

1. First and second body members each having a generally annular end face, means for clamping said body members together with said annular end faces in axially aligned face-to-face relationship, a relatively thin circular metal seal member having a continuous peripheral edge portion clamped between said end faces, said end faces each defining a separate corner with the corner on said first end face located radially inward of the corner on the second end face and axially offset relative thereto, said peripheral edge portion of said metal seal member extending over and being bent across each of said corners, said



end faces further defining first and second pairs of substantially flat and parallel clamping surfaces which respectively engage said metal seal member in radially spaced circumferentially continuous first and second seal areas, said first seal area lying radially inward of said first corner generally coplanar therewith, and said second seal area lying radially outward of said second corner generally coplanar therewith.

4,684,107

COMPOSITE METAL AND PLASTIC FENCE AND BRACKET

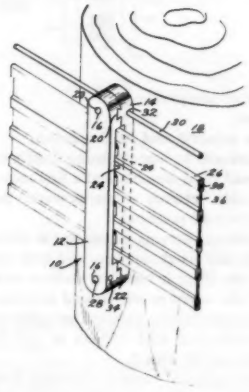
Edward S. Robbins, Jr., Rte. 7, Box 322, Florence, Ala. 35630

Filed Aug. 22, 1984, Ser. No. 643,008

The portion of the term of this patent subsequent to Aug. 14, 2001, has been disclaimed.

Int. Cl.[4] E04H *17/12*

U.S. Cl. 256—19 **24 Claims**



1. A fence comprising, in combination, an elongated web of plastic material having spaced substantially parallel edges along its length, each edge having a bead, a high tensile wire embedded in each bead along the length of said material, a substantially flat portion extending between said beads, a plurality of support bracket means each having means for attachment to a post, each bracket means having a first and a second bracket element each including a face with said face of each element having recess means for receiving a portion of said edges of said elongated web, the dimensions of said recess means, when said bracket elements are joined together being such that when a load is applied to said elongated web, the surfaces of said recess means will prevent said edges of said

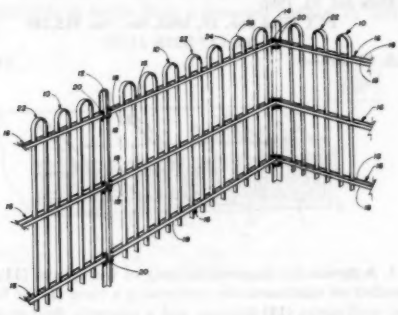
web from moving out of said recess while allowing said web to slide in a longitudinal direction.

4,684,108

PANEL FENCE

Sergio Bergagnini, P.O. Box 83408, Oklahoma City, Okla. 73148

Filed Sep. 10, 1986, Ser. No. 905,460
Int. Cl.[4] E04H *17/16*
U.S. Cl. 256—24 **7 Claims**



1. A fence to be mounted on a supporting structure comprising:

a plurality of panels, each panel comprising:

at least two horizontal rails, each of which includes a pair or horizontally spaced bars having their adjacent ends interconnected; and

a plurality of vertically extending, horizontally spaced pickets positioned between said horizontally spaced bars, each picket including a bar formed into an inverted U, wherein each picket is welded to at least a portion of said rails;

a post between each pair of panels extending below the lower ends of said pickets and the lowermost rail for attachment to the supporting structure; and

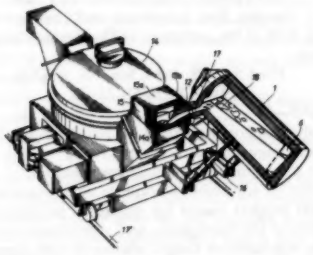
means securing the end of each rail to the adjacent post.

4,684,109

MELT-TRANSFER DEVICE FOR THE PROTECTED TAPPING OF MOLTEN METAL FROM ONE VESSEL TO ANOTHER

Ake Archenholtz, and Kare Folgerö, both of Västerås, Sweden, assignors to ASEA Aktiebolag, Västerås, Sweden

Filed Oct. 4, 1985, Ser. No. 784,046
Claims priority, application Sweden, Oct. 16, 1984, 8405156
Int. Cl.[4] C21C *7/00*
U.S. Cl. 266—216 **7 Claims**



1. A combined pouring furnace and melt-transfer device for supplying slag-free molten metal into said pouring furnace, said pouring furnace including a receiving channel and a protective hood thereover, said protective hood including a top wall and a side opening for receiving a melt-tapping pipe, and said melt-transfer device comprising

a cylindrical container having a cylinder side wall and first and second end walls, said first end wall having an opening therein, said cylindrical container defining a first longitudinal axis therethrough,

a lid covering said opening in said first end wall,

a baffle mounted on said second end wall to extend within said container and define a pocket which can contain a powder which has been fed through said opening in said first end wall when said cylindrical container is oriented such that its first longitudinal axis is vertically oriented,

a melt-tapping pipe connected to said cylindrical axis side wall near said first end wall, said melt-tappingpipe extending substantially tangentially away from said cylindrical side wall and perpendicularly with respect to said first longitudinal axis of said cylindrical container, said melt-tapping pipe providing an outlet channel therethrough and defining a second longitudinal axis, said melt-tapping pipe extending within said opening and below said top wall of said protective hood of said pouring furnace during melt tapping, and

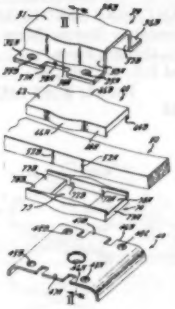
pivot means connected between said pouring furnace and said cylindrical container to support said cylindrical container and to cause it to tilt about said second longitudinal axis such that molten metal in said cylindrical container can flow through said melt-tapping pipe and into said receiving channel in said pouring furnace in a protected manner.

4,684,110

LEAF SPRING CLAMP WITH ATTACHMENT MEANS

Robert F. Sale, Novi, and Wayne E. Wells, Farmington Hills, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 2, 1985, Ser. No. 803,753
Int. Cl.[4] B60G *11/02*; F16F *1/36*
U.S. Cl. 267—52 **15 Claims**



1. A leaf spring clamp assembly adaped to secure a synthetic material leaf spring in position in a suspension system, which leaf spring has upper, lower and side surfaces, said leaf spring clamp assembly comprising:

a rigid clamp base comprising a bottom wall and two substantially parallel side walls extending from said bottom wall to form therewith a channel, wherein the inner surface of at least one said side wall fairs from each longitudinal end into a channel-widening concavity;

a resilient wedge insert adapted to be positioned within said channel, comprising a wedge insert bottom wall adapted to be positioned substantially parallel to and adjacent to said clamp base bottom wall, two substantially parallel side walls, each having an inner surface and an outer

surface, and a wedge insert top wall extending between said wedge insert side walls and forming therewith and with said bottom wall an inner channel adapted to have planar surface contact with said side surfaces of said leaf spring and to substantially encircle said leaf spring laterally, wherein the inner surface of each said wedge insert wall is adapted to contact said leaf spring along substantially the entire longitudinal dimension of said inner channel, and the outer surface of each said wedge insert side wall is adapted to be in substantial planar contact with the corresponding clamp base side wall to substantially fill said channel-widening concavity thereof, said wedge insert further comprising resilient support pads, one each of a first pair of said support pads being located at opposite longitudinal ends of said inner channel and having a contact surface adapted to contact and support one of said leaf spring upper surface and lower surface, and one each of a second pair of said support pads being located at opposite longitudinal ends of said inner channel and having contact surfaces adapted to contact and support the other of said leaf spring upper surface and lower surface, said contact surfaces of said first pair of support pads being offset from the inner surface of said wedge insert top wall and said contact surfaces of said second pair of support pads being offset from the inner surface of said wedge insert bottom wall; and

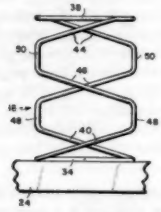
a clamp plate adapted, together with said clamp base, to hold said leaf spring between them, wherein said clamp plate and said clamp base together comprise means for holding themselves in assembly in contact with each other to provide a preselected pre-load on said wedge insert sandwiched between them, said means comprising longitudinal flanges extending outwardly from said clamp base side walls and extending portions of said clamp plate corresponding to said flanges, each of said flanges providing one of a tab and a correspondingly positioned slot and each of said extending portions comprising the other of said tab and said correspondingly positioned slot, each said tab being adapted to be bent into said correspondingly positioned slot to overlap a periphery thereof.

4,684,111

BENT WIRE SPRING MODULE

Robert C. Hagemeister, Boston, Mass., assignor to Webster Spring Co. Inc., Oxford, Mass.

Filed Feb. 14, 1986, Ser. No. 829,489
Int. Cl.[4] F16F *1/12*
U.S. Cl. 267—103 **3 Claims**



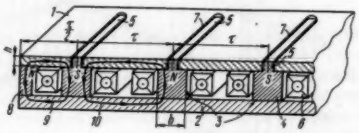
1. A spring module comprising lower and upper attaching elements by means of which the module can be attached, respectively, to a base frame and a grid frame and means yieldably connecting the lower and upper attaching elements comprising in transversely-spaced, parallel, vertical planes, first oppositely-inclined, upwardly-extending legs, second oppositely-inclined, downwardly-extending legs, said first legs being connected to the lower attaching element, said second legs being connected to the upper attaching element, third oppositely-inclined legs inclined in opposite directions from the first and second legs, and fourth vertically-disposed legs connecting the first legs to the third legs and the second legs to the third legs.

4,684,112

DEVICE FOR MAGNETIC HOLDING OF WORKPIECES

Jury L. Chernikov, prospekt Energetikov, 28/6, kv. 70, Leningrad; Bodgan I. Patykivsky, ulitsa Sovetskaya, 70, kv. 79, Drogobych, and Vladimir A. Chernovol, ulitsa Severnaya, 11, kv. 2, Vyborg, all of U.S.S.R.

PCT No. PCT/SU86/00001, § 371 Date Sep. 8, 1986, § 102(e) Date Sep. 8, 1986, PCT Pub. No. WO86/04287, PCT Pub. Date Jul. 31, 1986
PCT Filed Jan. 15, 1986, Ser. No. 915,249
Int. Cl.[4] B25B *11/00*
U.S. Cl. 269—8 **2 Claims**



1. A device for magnetic holding of workpieces (**11**) when handled on machine-tools, comprising a plate (**1**) for holding the workpieces (**11**) thereon, and a magnetic field excitation unit in the form of at least one core (**3**) placed on a base (**2**), a bottom portion (**4**) of said core being encompassed by a direct-current coil winding (**6**), while a top portion (**5**) of said core is accommodated in the interior of the plate (**1**) and it magnetically insulated therefrom with the aid of elements (**7**) made of a nonmagnetic material, characterized in that the bottom portion (**4**) of the core (**3**) is thickened so as to form, together with the top portion (**5**), a step in contact with the plate (**1**), the area of contact of the plate (**1**) with the core (**3**) not exceeding the cross-sectional area of the plate (**1**) as confined within the perimeter of the step of the core (**3**), and the distance (τ) between the axes of the cores (**3**) is determined by the following relationship:

$$\tau = \frac{1.6 \cdot 10^3 \cdot B \cdot h}{\sqrt{P_o}} + b,$$

where

B is the magnetic induction corresponding to the magnetic saturation of the material of the plate (**1**);

h is the thickness of the plate (**1**);

P_o is the specific attraction force applied to the workpiece (**11**);

b is the thickness of the bottom portions (**4**) of the cores (**3**).

4,684,113

UNIVERSAL HOLDING FIXTURE

William A. Douglas, East Lansdowne, and Theodore Ozer, Wallingford, both of Pa., assignors to The Boeing Company, Seattle, Wash.

Filed Sep. 28, 1984, Ser. No. 655,618
Int. Cl.[4] B25B *11/00*
U.S. Cl. 269—21 **11 Claims**

1. A universal holding fixture for holding a workpiece having a fixture engaging surface, comprising:

support means including a vacuum manifold;

a plurality of adjustable workpiece engaging rods mounted to said support means for engaging the fixture engaging surface of the workpiece, said workpiece engaging rods being adjustable in height relative to said support means;

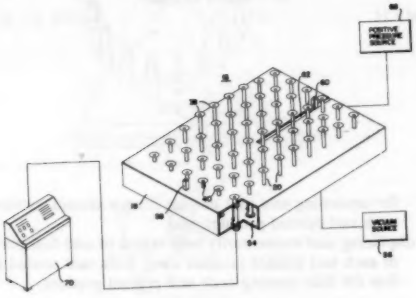
means for adjusting the height of each workpiece engaging rod independently of the workpiece and relative to said support means so that said plurality of adjusted rods re-

produces the contour of the fixture engaging surface of the workpiece; and

means for generating a holding force for holding the workpiece in engagement with said rods, the holding force acting through said rods, wherein:

said means for generating a holding force includes vacuum generating means connected to the vacuum manifold of said support means through which a vacuum, generated by said vacuum generating means, is communicated to each rod; and

each workpiece engaging rod includes a stationary guide bushing having a longitudinal slot open to the vacuum in said vacuum manifold, and a support rod in said bushing displaceable in height from a retracted position by said



adjusting means independently of the workpiece and relative to said guide bushing and the vacuum manifold, said support rod defining a free end situated externally of said vacuum manifold, said free end including a suction pad which engages the fixture engaging surface of the workpiece, said support rod further defining a passage terminating at one end at said pad and having an opening at its other end, said support rod passage being in communication with said manifold when said opening is aligned with said bushing slot when said support rod is not in its retracted position, and when said support rod is in its retracted position, said opening is not in alignment with said bushing slot, and said passage is not in communication with said manifold.

4,684,114

INDEX TABLES

Theodore F. Bell, Sr., 26 Twin Rivers Dr., Ormond Beach, Fla. 32074

Filed Oct. 31, 1986, Ser. No. 925,159
Int. Cl.[4] B23Q *1/16*
U.S. Cl. 269—57 **5 Claims**

1. An index table comprising

a base,

a main plate mounted on said base,

a drive wheel mounted for rotation on one side of said main plate about a first axis transverse to said main plate,

a workplate on the other side of said main plate rotatably mounted about a second transverse axis spaced from said first transverse axis,

a segment wheel mounted on said one side of said main plate and fixed with relation to the work plate,

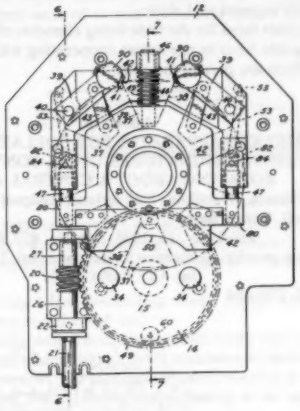
said segment wheel having circumferentially spaced radially extending slots,

circumferentially spaced segments drivers mounted on said drive wheel and being adapted to successively engage said circumferentially spaced slots on said segment wheel to drive said segment wheel intermittently and in turn drive said work plate,

a yoke plate mounted on said one side of said main plate for movement radially with respect to said drive wheel and said segment wheel,

spaced arms pivoted to said main plate,

each said arm supporting a locking projection for movement into and out of engagement with a respective slot in said segment wheel, and means interconnecting said arms and said yoke plate such that as said wheel rotates, each segment driver successively engages the yoke plate and moves said yoke plate relative to said segment wheel and as the said yoke plate is moved radially outwardly and inwardly, it swings said arms moving the respective locking projections out of and into engagement with the sides of angularly spaced slots on said segment wheel to unlock and lock the work plate against rotation.

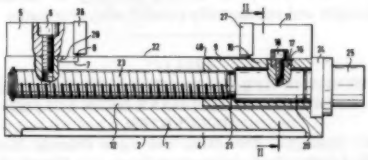


4,684,115

MACHINE TOOL VICE

Ludwig Krause, Waltenhofen, Fed. Rep. of Germany, assignor to Saurer-Allma GmbH, Kempten, Fed. Rep. of Germany

Continuation of Ser. No. 784,105, Oct. 4, 1985, abandoned. This application Dec. 12, 1986, Ser. No. 942,019
Claims priority, application Fed. Rep. of Germany, Oct. 24, 1984, 3438900
Int. Cl.[4] B25B *1/10*
U.S. Cl. 269—136 **5 Claims**



1. A machine tool vice comprising a vice body, a slide guidably movable in the vice body, a clamping mechanism operable by the clamping mechanism, one of said jaws being mounted upon the vice body as a fixed jaw and the other of said jaws being mounted upon the slide, a clamping zone arranged between the jaws, said clamping mechanism being arranged below said zone, the clamping zone and both jaws being disposed above top edges of the vice body and the slide, a recess formed in the vice body to receive said slide, said recess opening upwardly and extending over the entire length of the vice body, and retention means suitable for retaining the said jaws mounted upon the vice body and upon the slide respectively, said retention means being releasable and capable of accepting

interchangeable jaws of various configurations in a selective manner;

the fixed jaw having a bridge-like configuration in the region of its mounting;

the vice body having a generally U-shaped form surrounding the upwardly opening recess;

the top edge of the vice body and the top edge of the slide having approximately the same level of height;

said recess including a pair of guide faces adapted to slideably support said slide;

the guide faces for the slide being elements of the vice body;

the guide faces in the recess cooperating with guide tenons which are part of the slide.

4,684,116

METHOD AND APPARATUS FOR COLLATING FOLDED PRINTED SIGNATURES USING CONVEYORS ROTATING ABOUT A CENTRAL AXIS

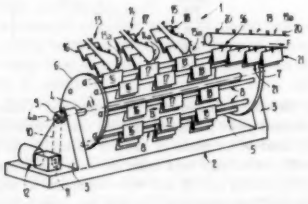
Egon Hänsch, Wetzikon, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Jun. 23, 1986, Ser. No. 877,359

Claims priority, application Switzerland, Jul. 1, 1985, 2828/85

Int. Cl.[4] B65H *39/02*

U.S. Cl. 270—54 **25 Claims**



1. A method for collating folded printed products, especially signatures, comprising the steps of:

conveying the folded printed products in an advancing conveying movement and in straddlingly superimposed relationship along a plurality of substantially straight and substantially parallel conveyor paths positioned radially around a common axis of revolution; and

revolving said plurality of substantially straight and substantially parallel conveyor paths about said common axis of revolution together with said folded printed products during said advancing conveying movement along respective conveyor paths of said plurality of substantially straight and substantially parallel conveyor paths.

4,684,117

METHOD AND APPARATUS FOR OPENING PRINTED PRODUCTS WHICH HAVE BEEN FOLDED OFF-CENTER

Werner Honegger, Tann-Rüti, and Egon Hänsch, Wetzikon, both of Switzerland, assignors to Ferag AG, Hinwil, Switzerland

Filed Jun. 23, 1986, Ser. No. 877,360

Claims priority, application Switzerland, Jul. 1, 1985, 2828/85; Jul. 26, 1985, 3245/85

Int. Cl.[4] B65H *39/02*

U.S. Cl. 270—54 **24 Claims**

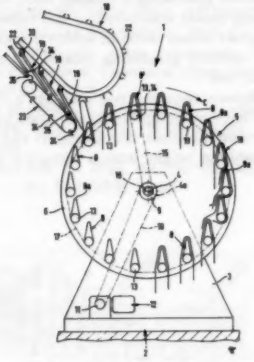
1. A method for opening asymmetrically folded printed products, comprising the steps of:

gripping each printed product of the asymmetrically folded printed products at a folded edge thereof;

each said printed product possessing a first portion comprising an open edge located opposite said folded edge;

conveying the asymmetrically folded printed products in a direction transverse to said folded edges and with said open edges leading;

momentarily holding said first portion containing said open edge of each said printed product during conveyance of each said printed product at the region of said open edge



for separating said first portion from a second portion of each said printed product; and

displacing said momentarily held region of said first portion of each said printed product away from said second portion for thus opening each said printed product.

4,684,118

APPARATUS FOR TEMPORARY STORAGE OF PRINTED PRODUCTS BETWEEN SUCCESSIVE PROCESSING MACHINES OF A PRODUCTION LINE

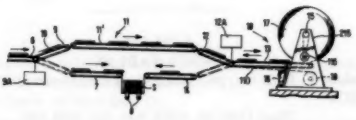
Heinz Boss, Strengelbach, and Walter Weber, Brittnau, both of Switzerland, assignors to Grapha-Holding AG, Hergiswil, Switzerland

Continuation of Ser. No. 785,522, Oct. 8, 1985, abandoned. This application Dec. 19, 1986, Ser. No. 942,938

Claims priority, application Switzerland, Oct. 12, 1984, 4892/84

Int. Cl.[4] B65H *39/00*

U.S. Cl. 270—58 **3 Claims**



1. In a production line for printed products, particularly paper sheets, the combination of a first processing unit for printed products; a second processing unit for printed products; means for transporting printed products from said first unit to and beyond said second unit, said transporting means including a segment which extends between said first and second units; a reservoir for temporary storage of printed products travelling from said first unit to said second unit by way of said segment, said reservoir comprising first and second rotors, a flexible band having first and second end portions affixed to the respective rotors and an intermediate portion, and means for selectively rotating at least one of said rotors in directions to convolute the intermediate portion of the band onto and to unwind the intermediate portion from said one rotor; and means for conveying printed products from said segment to said reservoir and back so that the reservoir can take up the surplus of printed products when the output of the first unit exceeds the requirements of the second unit and the reservoir can supply printed products to the second unit by

way of said segment when the requirements of the second unit exceed the output of the first unit, said conveying means comprising means for feeding printed products from said segment onto the intermediate portion of said band so that the products thus fed are stored on the one rotor between the convolutions of said intermediate portion.

4,684,119

SHEET FEEDING APPARATUS

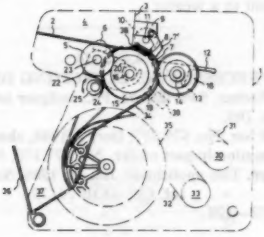
Martin Lane, Hampshire, England, assignor to De La Rue Systems Limited, London, England

Filed Jun. 28, 1984, Ser. No. 625,795

Claims priority, application United Kingdom, Jul. 25, 1983, 8319972

Int. Cl.[4] B65H *7/06*

U.S. Cl. 271—4 **11 Claims**



1. Sheet feeding apparatus for feeding sheets from an input station to an output station, the apparatus comprising stripper means including a stripper roller and at lest one separation roller, said stripper roller cooperating with said at least one separation roller to define a separation nip; transport means including at least one drive roll and auxiliary roll, said rolls being in contact with one another to define a nip into which said sheets are fed by said stripper means, said at least one drive roll being mounted on a drive roll shaft and the or each said auxiliary roll being mounted on an auxiliary roll shaft and wherein said stripper roller is mounted on a stripper roller shaft having a larger diameter than said drive roll shaft, said stripper roller shaft being eccentrically mounted about said drive roll shaft and movable relative to said drive roll shaft to adjust the size of the separation nip, said stripper means being adapted to feed said single sheets to said output station; sensing means adapted to sense the acceptability of sheets fed by said stripper means; and drive means for continuously driving said transport means and for driving said stripper means, the arrangement being such that said stripper means is normally continuously driven but is adapted to be selectively stopped in response to said sensing means sensing the passage of an unacceptable sheet whereupon any of said sheets already fed to said transport means will be transported to said output station by said transport means under the control of said drive means.

4,684,120

PICKING AND SEPARATING DEVICE FOR TRANSPORTING ONE OR MORE FABRIC PILES FROM A STACK

Nabil Kamal, 8166 St. Denis Street, Montreal, Quebec, Canada

Filed Apr. 25, 1986, Ser. No. 855,681

Int. Cl.[4] B65H *3/22*

U.S. Cl. 271—18.3 **17 Claims**

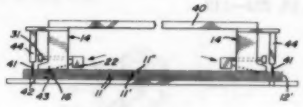
13. A method of separating, picking and transporting one or more upper ones of sheet-like material from a stack of such material, said method comprising:

(i) providing a frame having a picker mechanism with a plurality of aligned angulated needles movable in and out of a top surface of said stack;

(ii) effecting relative movement of said frame and said top surface of said stack to apply pressure against an upper one of said sheet-like material in said stack;

(iii) penetrating said needles at a picking angle to engage predetermined upper ones of said sheet-like material in said stack; and

(iv) effecting relative displacement between said frame and said top surface to discharge said uppermost sheets engaged by said needles, said sheet-like material stack being a stack of fabric plies, there being two of said picker mechanisms secured to said frame in a spaced apart rela-



tionship with said needles of said two picker mechanisms extending away from one another in outward opposite directions, and wherein there is further provided the steps of

(v) positioning a free descending needle in said fabric stack from a top end thereof; and

(vi) advancing said descending needles when said step (ii) is performed whereby to provide resistance to said underlying fabric plies not engaged by said needles to prevent underlying fabric pieces from adhering to an uppermost engaged fabric piece.

4,684,121

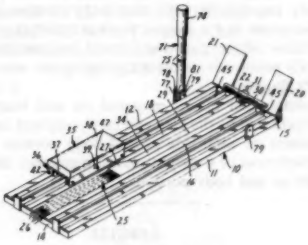
MULTIPLE EXERCISE UNIT

Sander C. Nestegard, 175 Galtier Pl., Shoreview, Minn. 55126

Filed Nov. 5, 1986, Ser. No. 927,535

Int. Cl.[4] A63B *69/18*

U.S. Cl. 272—97 **5 Claims**



1. An exercise device for simulating the exercise from various sports and for performing various exercises on various muscles of the body, said device comprising:

a rectangular frame, said frame having two longitudinal side members, two members parallel to and spaced from said side members defining a pair of longitudinally extending rails, and two end members,

roller member means mounted on said rails for rolling movement therealong and for support of the feet of the operator, brake means on said roller member means and said rails for resisting rolling movement of said roller member means along said rails,

arm means attached to said longitudinal side members for pivotal movement in relationship to said side members, said arm means having a length to permit grasping when standing on said roller member means, and resistance means for varying the force necessary to pivot said arm means in a simulated cross-country skiing exercise,

foot braces on one of said end members,

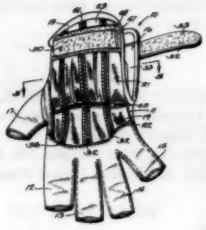
a pulley positioned between said foot braces,
spring means disposed between said rails and fixed to the other of said end members, and
a handle and cable connected to said spring means and to said pulley to afford a rowing exercise and arm curls.

4,684,122
WEIGHT EXERCISE CUFF AND ATTACHMENTS
James L. Desmond, E. Genesee St., Rd. #4, and Joseph L. Locastro, 183½ Lake Ave., both of Auburn, N.Y. 13021
Filed May 27, 1986, Ser. No. 866,811
Int. Cl.[4] A63B *21/12*
U.S. Cl. 272—119 **11 Claims**

1. A cuff device with attachments permitting weight-related exercises of the arms and upper body of a wearer without placing significant stress on the hands, fingers or wrists, said cuff and attachments comprising; in combination:
(a) a body portion including a pair of rigid outer shells having resilient inner linings, said shells being constructed in complementary halves;
(b) hinge means connecting said halves for relative movement between a closed position, wherein said body portion is essentially in the form of a tapered cylinder and an open position, wherein the wearer's wrist and forearm may be placed or withdrawn from between said halves;
(c) closure means for releasably securing sid halves in said closed position;
(d) an engagement member having a shank portion releasably engageable with said body portion and extending therefrom and a curved portion overlying the palm of a wearer of the cuff and curved rearwardly toward said body portion to simulate a gripping curvature of the wearer's fingers;
(e) attachment means mounted on said body portion for attachment to the free end of a weighted cable; and
(f) means on each side of said body portion for releasable attachment of a weight carrying member directly to each side of said body portion.

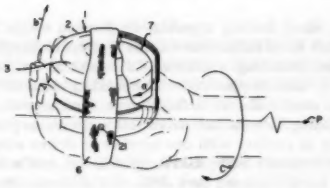
4,684,123
EXERCISE GARMENT
Jonn J. Fabry, 226 Miramar, Green Bay, Wis. 54301
Filed May 31, 1985, Ser. No. 739,881
Int. Cl.[4] A63B *21/12*
U.S. Cl. 272—119 **11 Claims**

1. A garment, comprising:
a garment body;
a pocket disposed on said garment body having an open end;
a fastener base element secured to said garment body adjacent said open end of said pocket;
a closure flap secured to said pocket for selectively opening and closing said pocket, said closure flap having a first releasable fastener element secured to the underside thereof and further having a second releasable fastener element secured to the outside thereof, said first releasable fastener element being releasably engageable with said base element to secure said closure flap to said garment body; and
a strap attached to said garment body, said strap having a third releasable fastener element secured thereto, said strap being positioned so that said third releasable fastener element can be releasably engaged with said second releasable fastener element as said first releasable fastener



element engages said fastener base element to secure said garment to a wearer.

4,684,124
PRECESSIONAL EXERCISING DEVICE
James C. Escher, Swarthmore, Pa., assignor to Gyro-Flex Corporation, Del.
Division of Ser. No. 679,257, Dec. 7, 1984, abandoned, which is a continuation-in-part of Ser. No. 477,175, Mar. 21, 1983, abandoned. This application Jul. 30, 1986, Ser. No. 892,080
Int. Cl.[4] A63B *21/22*
U.S. Cl. 272—128 **10 Claims**



1. A precessional exercising device adapted to be attached to a hand of an individual, comprising:
a housing containing a rotatable cup-shaped mass,
said mass having a spin axis about which the mass is dynamically balanced, so that the centroid of mass of said mass lies on said spin axis,
said mass having a peripheral lip with a cylindrical inner surface surrounding and coaxial with said spin axis,
said housing also having top and bottom holding surfaces which are substantially perpendicular to said spin axis;
bearing means mounting the mass within said housing for rotation about said spin axis;
an electric motor for spinning the mass about said spin axis,
said motor having a stator core and a stator winding disposed on said core,
said stator winding being disposed within the lip of said mass,
said motor having a rotor comprising said mass, said rotor including a plurality of permanent magnets disposed on and secured to the cylindrical inner surface of said lip and surrounding the stator winding of said stator, so that when said stator winding is energized to generate a rotating magnetic field which interacts with the magnetic fields of said permanent magnets, said mass is caused to rotate at a speed corresponding to the speed of rotation of the stator magnetic field; and
holding means connected to said housing for enabling said housing to be rotated so as to change the direction of said spin axis,
said holding means comprising a strap extending in juxtaposition with at least one of said top and bottom holding

surfaces and adapted to retain the hand of an individual in a position between the strap and a selected one of said holding surfaces, with the selected holding surface resting against the palm of the hand and said spin axis substantially perpendicular to the palm of the hand, so that the centroid of mass of said rotating mass is displaced from the palm in a direction substantially perpendicular to the palm.

4,684,125

MUSCLE BUILDING APPARATUS

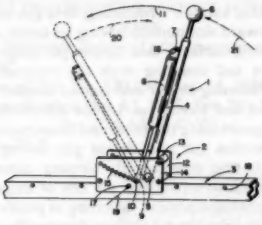
Ingvar Lantz, Fregattvägen 68, S-117 48 Stockholm, Sweden

PCT No. PCT/SE83/00430, § 371 Date Aug. 23, 1984, § 102(e) Date Aug. 23, 1984, PCT Pub. No. WO84/02659, PCT Pub. Date Jul. 19, 1984

PCT Filed Dec. 6, 1983, Ser. No. 645,816

Int. Cl.[4] A63B *21/00, 5/00*

U.S. Cl. 272—130 **9 Claims**



1. Muscle building apparatus comprising:

an integral power pack including a carrier, a force reaction arm (1) pivotally mounted at one end (5) in the carrier (2) for movement back and forth between a starting position and a return position, and elongated gas spring means (8), the gas spring means (8) also being pivotally mounted at one end (9) to the carrier (2) and pivotally connected at the opposite end (16) with the force reaction arm (1) at a position remote from the carrier (2), the force reaction arm (1) and the elongated gas spring means (8) being mounted on the carrier to assume substantially parallel relationship at the return position, with cross bores located on the carrier between the arm and the spring means at mounting points, each bore providing a moment arm variable with the reaction arm movement between the starting and the return position, the moment arm reaching a maximum at a position of the force reaction arm intermediate the starting and return positions, said cross bores enabling the setting of different reaction force functions, and

an elongated support bar (3) having selectable mounting positions along the bar for mounting said power pack including the carrier, the force reaction arm, and the gas spring means for movement of the arm back and forth in opposite directions at each mounting position.

4,684,126

GENERAL PURPOSE EXERCISE MACHINE

William T. Dalebout, Portland, Oreg.; Sohrab Vassoughi; William J. Martinell, both of Vancouver, Wash.; David C. Rohrer, Gaston, Oreg.; Steven W. Martinell, Vancouver, Wash., and Robert L. Marchant, Portland, Oreg., assignors to Pro Form, Inc., Beaverton, Oreg.

Continuation of Ser. No. 645,497, Aug. 29, 1984, abandoned. This application Dec. 31, 1985, Ser. No. 815,750

Int. Cl.[4] A63B *21/00*

U.S. Cl. 272—134 **1 Claim**

1. An exercise machine having a frame having a front end and a rear end,

said frame being of inverted V-shape in side elevation, providing a rear portion inclined downwardly rearwardly, and a front portion inclined downwardly forwardly,

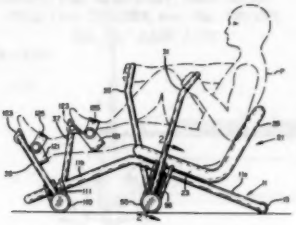
a forwardly oriented seat on said frame,

said seat having a seat portion and an angularly related backrest portion,

said seat portion being fixedly supported by said rear portion of said frame so that said seat is rearwardly tilted, with the seat portion generally paralleling the rear frame portion and the backrest portion disposed at an abrupt angle to said rear frame portion,

said seat being so located relative to the apex of said frame that the knees of the user at least approximately overlie said apex,

arm exercise means for performing pushing and pulling arm exercises, the arm exercise means being carried by said frame locally of said seat,



and leg exercise means for performing pushing and pulling leg exercises, the leg exercise means being independent of said arm exercise means and carried by said frame locally of the front end of said frame,

each exercise means having resistance means providing resistance to movement in opposite directions, the resistance means for the leg exercise means providing greater resistance to pushing forces than to pulling forces, the resistance means for the arm exercise means providing greater resistance to pulling forces than to pushing forces,

said leg exercise means providing foot rest means located at the front end of said frame.

4,684,127

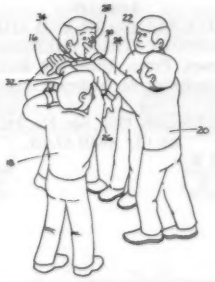
GAME WITH TETHER STRAPS

Elliot A. Rudell, 2215 237th St., Torrance, Calif. 90501

Filed Mar. 6, 1987, Ser. No. 22,758

Int. Cl.[4] A63F *9/00*

U.S. Cl. 273—1 G **25 Claims**



1. A game method which comprises the steps of:

a. selecting at least four players;

b. arranging the players in an assembly facing each other;

c. interconnecting a limb of each player to an adjacent players by attaching tethers, which distally bear limb grasping means and which are from 10 to about 30 inches long, between the limbs of each of the players;

d. randomly selecting and sequentially giving manipulation commands to selected players which require the selected players to establish and maintain contact with a designated point of a player; and

e. keeping the score of successfully executed commands.

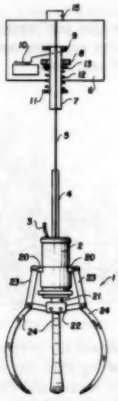
9. The method of claim 1 wherein said players are positioned in a circle.

4,684,128

GRAB FOR SLOT MACHINES

Achiel Verstraeten, Sint-Niklaas, Belgium, assignor to Elektro Automaten Verstraeten p.v.b.a., Sint Niklaas, Belgium

Filed Apr. 10, 1986, Ser. No. 850,318
Claims priority, application Belgium, Apr. 26, 1985, 2/60673
Int. Cl.[4] A63F *9/00*
U.S. Cl. 273—1 GC **4 Claims**



1. A device for stably supporting a grab from a crab of a crane type slot machine, comprising:

a crab adapted to be moved inside the slot machine, said crab having a cable and means for raising and lowering the cable; and

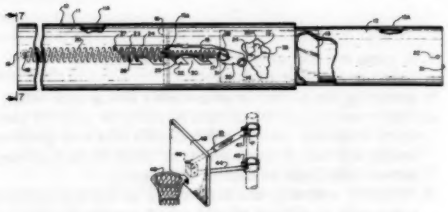
a grab including a casing for a solenoid coil, said casing being connected to a lower end of the cable, a plurality of arms adapted to grab a prize inside the slot machine, said arms being pivotally connected to the casing, and a first hollow tube connected to the casing for surrounding the cable so that the grab does not extremely incline when the grab holds a prize and does not swing when the crab moves inside the slot machine.

4,684,129

BASKETBALL STANDARD AND ADJUSTABLE SUPPORT STRUT THEREFOR

Robert L. Andersen, Provo, Utah, and Richie D. Andersen, Mesa, Ariz., assignors to Andersen Manufacturing, Inc., Provo, Utah

Filed Mar. 24, 1986, Ser. No. 843,245
Int. Cl.[4] A63B *63/08*
U.S. Cl. 273—1.5 R **14 Claims**



6. A basketball standard including, in combination: a backboard having front and back surfaces and provided with a hoop projecting forwardly from said front surface; a support; means coupled to and between said support and said backboard, at the latter's back surface, for vertically-adjustably securing said backboard to said support; and an adjustable strut, articulatively secured to and between said backboard and one of said means and said support, for positioning said backboard at a pre-selected height, said adjustable strut including, in combination: a first, elongate outer tublar member; a second, elongate inner tubular member telescopingly disposed within and extensible beyond said first member and provided with a sidewall camming slot; said first and second members each having circumferential sidewalls; a follower member having a side-outwardly directed detent pin disposed in and extending outwardly beyond said camming slot, said follower member being slidably disposed for longitudinal movement within said second member, said first member having a contoured sidewall longitudinal slot provided, on one edge thereof, with a series of mutually-spaced detent slots defined by a series of teeth rearwardly canted, a rearward slot portion having an upwardly sloping camming surface terminating in a pin positioning recess, and a forward slot portion having an upper, downwardly sloping camming surface, said detent pin projecting in said contoured slot and coacting with the contoured periphery thereof, said camming slot of said second member being essentially L-shaped and having an L-foot selectively registering with said pin-positioning of recess and constructed as a detent carrier slot portion for said detent pin during longitudinal forward-travel, said downwardly sloping camming surface being constructed to move said pin out of engagement with said detent carrier slot portion, whereby to position said detent pin for selective engagement with said mutually-spaced detent recesses, said second member having a spring retainer; and coil spring means coupled to and between said spring retainer of said second member and said follower.

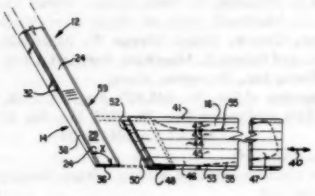
11. A basketball standard including, in combination: a backboard provided with a hoop; first means coupled to said backboard or adjustably securing said backboard to external support structure; and second means coupled to said backboard for adjusting and releasably fixing the height of said backboard relative to a lower, external playing surface, said second means comprising (1) a pair of telescoping tubes each having registering, camming configured sidewall apertures, and (2) pin means projecting through said sidewall apertures for selectively determining the combined extension of said tubes, said sidewall aperture of the outermost one of said tubes having pin camming surfaces and mutually-spaced, rearwardly angulated, detent recesses disposed therebetween.

4,684,130

ICE HOCKEY STICK

Denis Drolet, Sherbrooke; William Burchmore, Magog, and Léo Drolet, Cookshire, all of Canada, assignors to Inclasco Corporation Ltd., Canada

Filed Feb. 18, 1983, Ser. No. 467,850
Claims priority, application Canada, Dec. 23, 1982, 418423
Int. Cl.[4] A63B *59/14*
U.S. Cl. 273—67 A **15 Claims**



5. An ice hockey stick comprising:

an elongated rigid handle having a front and a rear side and two opposite lateral sides, said handle having a generally

constant rectangular cross-section and also comprising a tapered lower end portion, said handle further comprises:

(a) a body of foam injected plastic material of a suitable density and resistance;

(b) a longitudinally extending, centrally located filler member; and

(c) centrally on each lateral side, a flush reinforcing strip of undirectional strands of fibers in a suitable bonding agent;

a blade comprising a rear edge and being permanently secured to said lower end portion of said handle by means of a glued joint consisting of a conforming tapered groove in the rear edge of said blade into which the lower end portion of said handle is completely inserted having the rear side of the tapered lower end portion flush with the rear edge of said blade, said blade being made of a piece of hardwood whose grain extends longitudinally from end-to-end of said blade and extending over both lateral sides of said tapered lower end portion.

4,684,131

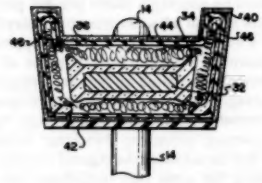
GRAPHITE COMPOSITE RACQUET WITH ARAMID CORE

Raymond L. Mortvedt, Santee, Calif., assignor to Ektelon, San Diego, Calif.

Continuation of Ser. No. 620,634, Jun. 14, 1984, abandoned. This application Oct. 17, 1985, Ser. No. 788,441

Int. Cl.[4] A63B *49/10*

U.S. Cl. 273—73 F **6 Claims**



1. A throatless and wishbone shaped graphite composite racquet frame having a head, a neck and a handle, said frame comprising:

a core of aramid;

a layer of graphite fibers surrounding said core; and

a fiber glass wrapping positioned over said layer of graphite fiber, forming a composite thereby;

wherein the graphite fiber is cushioned by the aramid on the inside and the fiber glass wrap on the outside of the racquet frame,

said core of aramid, said layer of graphite fibers, and fiber glass wrapping being continuous throughout the head, neck and handle portions of the frame;

and a pair of opposite boron inserts in the neck portion of the racquet, said inserts positioned on opposite sides of the frame substantially parallel to each other to achieve higher stiffness and strength in the neck region without added weight or bulk, said boron inserts being positioned over said graphite layer and under said fiber glass wrapping.

4,684,132

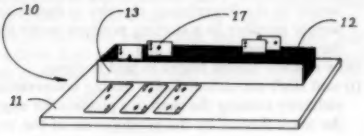
DEVICE FOR HOLDING PLAYING CARDS AND THE LIKE

Russel E. Wolford, Rte. 4, Kearney, Nebr. 68847

Filed Oct. 21, 1985, Ser. No. 789,652

Int. Cl.[4] A63F *1/10*

U.S. Cl. 273—150 **7 Claims**



1. A playing card holder, comprising:

a plurality of equal-sized paper sheets bound together along one edge to form a pack, said pack affixed along said binding to the upper face of a base board, wherein the bound edge and the adjacent portion of the sheets in said pack are in face to face contact with each other, whereby adjacent sheets will be biased against the removal of playing cards inserted between them, and wherein the means for binding the sheets together includes a plurality of nails, of a length less than the depth of said pack of sheets, driven in a staggered arrangement from opposing faces of said pack and adjacent the lower edge.

4,684,133

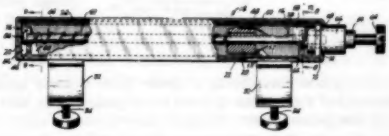
SWING FORCE INDICATOR FOR A PLAYING PIECE OF SPORTS EQUIPMENT

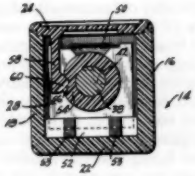
Sybil Maroth, 371 SW. 8th St. Apt 1B-W, Boca Raton, Fla. 33432

Filed Oct. 20, 1986, Ser. No. 920,748

Int. Cl.[4] A63B *69/36*

U.S. Cl. 273—186 A **19 Claims**





1. A swing-force indicator for a playing piece of sports equipment intended to be swung in the playing of a game, comprising, in combination:

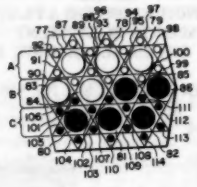
(a) an elongate housing,
(b) an elongate shaft, and bearings disposed adjacent opposite ends of said housing for mounting the shaft for lengthwise turning movement in the housing,
(c) a manually engageable finger piece rigid on one end of the shaft,
(d) a weight member having an indicator, slidable along the shaft,
(e) a compression spring on the shaft, engaging the weight member to bias it toward one end of the shaft, to a starting position,
(f) said weight member having a pawl device and said shaft having a one-way track which the pawl device can traverse and with which it is cooperable to hold the weight member in various adjusted positions remote from the starting position as attained in response to centrifugal force acting against the action of the compression spring,
(g) said shaft having a relieved track portion over which the pawl device can alternately freely ride when the shaft is turned by the finger piece, thereby to enable return of the weight member to a starting position under the action of the compression spring, and
(h) a resilient detent finger in said housing,
(i) said shaft and detent finger having cooperable means for yieldably holding the shaft in a position for engagement of the track thereof by the pawl device of the weight member.

4,684,134

HEXAGRAM GAME BOARD, APPARATUS AND GAME

Marvin A. Nelson, 801 E. Decker, Viroqua, Wis. 54665

Filed Aug. 15, 1985, Ser. No. 765,942
Int. Cl.[4] A63F *3/02, 3/00*
U.S. Cl. 273—261 **2 Claims**



1. A method for playing a game upon a game apparatus comprised of a game board and a set of game pieces, said game pieces comprising a set of major playing pieces and a set of minor playing pieces respectively adapted for use by opposing players with each set being provided with means of identifying the game pieces of each opposing player, said game board comprising a plurality of horizontally aligned hexagonal spaces and a plurality of triangular spaces systematically arranged upon the game board with said triangular spaces abutting the sides of the hexagonal spaces so as to provide in combination therewith an arrangement of a plurality of hexagrams upon said game board, said plurality of hexagrams being arranged upon said game board so as to provide a first outer row of horizontally aligned hexagrams, a second outer row of horizontally aligned hexagrams the number of which equals the number of hexagrams contained in said first outer row and an inner row containing at least one hexagram, said inner row also containing a plurality of horizontally aligned hexagonal spacings the number of which hexagonal spacings exceeds the number of hexagonal spaces included within said first outer row, said horizontally aligned hexagonal spaces of said inner row being positioned upon said game board in diagonal alignment with the hexagonal spaces of said first outer row and said second outer row; said game pieces comprising a set of major playing pieces and a set of minor playing pieces for each player with said set of major playing pieces and said set of minor playing pieces respectively being adapted for emplacement upon said hexagonal playing spaces and the triangular playing spaces abutting the sides of said hexagonal playing spaces, said method of playing said game comprising:

(a) placing a plurality of major playing pieces for the first player in each of the hexagonal playing spaces within the first outer row and a sufficient number of juxtapositioned major playing pieces in hexagonal playing spaces of the inner row, beginning with an outside positioned hexagonal playing space therein, so as to permit each player to place an equal number of major playing pieces within the available hexagonal playing spaces of said inner row;
(b) placing an equal number of major playing pieces of the second player in the second outer row and said inner row with the placment in said inner row being upon the opposite side of the game board from the major piece placement thereupon by the first player;
(c) placing a plurality of minor playing pieces for the first player in each of the triangular playing spaces abutting the sides of the hexagonal playing spaces in said first outer row so as to encompass each major playing piece positioned therein with minor pieces of the first player, and correspondingly placing an equal number of minor playing pieces for the second player in each of the triangular playing spaces abutting the hexagonal spacing in said second outer row;
(d) commencing game play by alternating the moves of the game play pieces between the first player and the second player upon the game board with each player proceeding to capture the major playing pieces and the minor playing pieces of the other player under a game play wherein each player permitted to move only one game playing piece per move with each a minor playing piece being permitted to only forwardly move into an adjacent triangular playing space and said major playing pieces being only permitted to move into any juxtapositioned hexagonal playing spaces provided neither of the triangular playing spaces abutting the side of the hexagonal playing space in the direction of movement of said major playing piece contains a minor playing piece of either player;
(e) sequentially alternating the permissible moves between the first player and the second player with each player proceeding in an attempt to capture or entrap the major playing pieces and the minor playing pieces of the opposing player with the capture of a minor playing piece being effectuated by moving a minor playing piece by the moving player into an adjacent triangular playing space occupied by a minor playing space of the opposing player and the capture of a major playing piece of the capturing player being effectuated by moving a major playing piece into a hexagonal space occupied by a major playing piece of the opposing player and to entrap an oposing player's major playing piece by blocking further movement thereof into an adjacent hexagonal playing space; and
(f) continuing the game play until either the first player or the second player has captured or entrapped all of the major playing pieces of the opposing player.

4,684,135

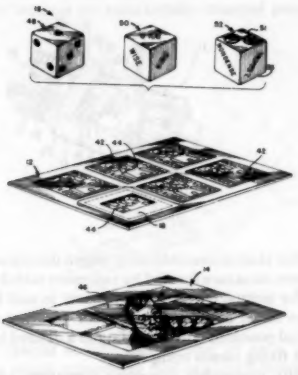
STORY TELLING GAME

Robert A. Bouchal, 48 Liberty Ave., Somerville, Mass. 02144

Filed Jun. 15, 1984, Ser. No. 620,956
Int. Cl.[4] A63F *3/06, 1/00;* **A63B** *71/00;* **G09B** *19/00*
U.S. Cl. 273—269 **19 Claims**

1. Game for stimulating innovation and exercising fundamental thinking and communication skills comprising, in combination, a plurality of first named planar members, each of a

predetermined size and shape and to be used by a player of the game, a plurality of spaced-apart pictorial illustrations being affixed to and on each said first named planar members, each said pictorial illustration being provided with a legend specifying a different primary characteristic of a story to be told by a player of the game, the same pictorial illustrations and legends being provided on each of said first named planar members, a plurality of second named planar members, a different image being affixed to and on, and expressed by each said second named planar member, means for randomly determining the



number of said second named planar members for use by a game player in making up and telling a story during the play of the game, means for randomly determining that certain primary characteristic of the said story to be told by a player, the said certain characteristics determined by the said random means corresponding to the legends provided on said first named planar members, and means for use by each player in association with said first named planar member being used by a player during the play of the game for recording and indicating that the said story of the randomly determined characteristic has been told by that player.

4,684,136

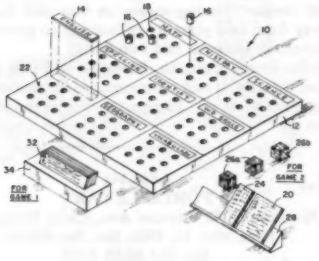
COMBINATION TIC-TAC-TOE AND QUESTION AND ANSWER GAME

Philip Turner, 2 Walter Ct., Bethpage, N.Y. 11804

Filed Jun. 10, 1985, Ser. No. 743,043

Int. Cl.[4] A63F *3/00*

U.S. Cl. 273—271 **3 Claims**



1. A game apparatus which comprises:

(a) means for forming nine tic-tac-toe arrangements in a square pattern, each said tic-tac-toe arrangement being labeled as a different subject area, said forming means including a playing board having a plurality of apertures;

(b) a plurality of playing cards having questions and answers to said questions, said questions and said answers being of grade level in difficulty, said playing cards having consecutively numbered questions and answers;

(c) a holder for setting up said playing cards;

(d) means for scoring when said correct questions are answered until three said tic-tac-toe arrangements are won in a vertical, horizontal, diagonal row to completely win said game, said scoring means including two different sets of playing pieces used by each player by placing each said playing piece into one of said apertures on said playing board; and

(e) means for randomly choosing one of said numbered questions to be answered by one of said players, said randomly choosing means further comprising two dice being of one color so that when rolling said dice they will occupy the tens and hundreds place with lower die number always going to said hundreds place, and one die being of another color so that when rolling said die it will always occupy the ones place, thus three said dice will indicate a three digit number corresponding to one of said numbered questions on one of said playing cards.

4,684,137

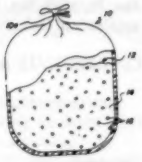
SIMULATED WAR GAME WEAPON

Leon N. Armer, Jr., 22 Utica St., Brockport, N.Y. 14420; Joseph M. Antonio, 151 Rosecroft Dr.; Craig A. Roth, 241 Haviland Pk., both of Rochester, N.Y. 14616, and James R. VerWeire, 48 Ogden Ctr. Rd., Spencerport, N.Y. 14559

Filed Sep. 6, 1985, Ser. No. 773,442

Int. Cl.[4] A63B *71/02*

U.S. Cl. 273—428 **5 Claims**



3. A weapon emulating a grenade, for use in a simulated war game, said weapon comprising:

a marking agent;

means for suspending said marking agent for ready dispersion, said suspending means including a non-toxic washable, biodegradable combination of water and rock dust;

a readily frangible ballon containing said suspending means and said marking agent whereby, when said balloon is delivered like a grenade to strike a target, said balloon ruptures and said suspending means disperses said marking agent against said target; and

a container adapted to receive said balloon and protect said balloon from accidental rupture.

4,684,138

CHUCK FOR USE IN DRIVING LAG RODS WITH A DRILL HAVING A REVERSIBLE MOTOR

James A. Michaud, 179 Marrett St., Westbrook, Me. 04092

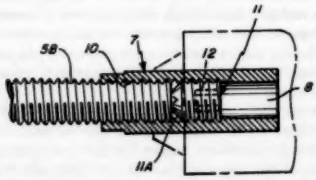
Filed Aug. 4, 1986, Ser. No. 892,415

Int. Cl.[4] B23B *31/10*; B25B *13/50*

U.S. Cl. 279—7 **5 Claims**

1. A chuck for use in driving lag rods into wooden supports with a hand drill having a reversible motor, said lag rods of a type having an end portion having machine threads, said chuck having an axial bore extending therethrough to establish first and second end portions of the chuck, the bore of said first end portion threaded to receive said end portions of the lag rods

and the bore of the second end portion unthreaded, and a plug member of substantially less length than said first end portion and threaded therein, said plug member having a formation at



one end engageable by a tool inserted into the bore then to enable said plug member to be turned until seated at the inner end of the threaded end portion for engagement by the extremity of said end portion of a lag rod when threaded therein.

4,684,139

DRILL CHUCK

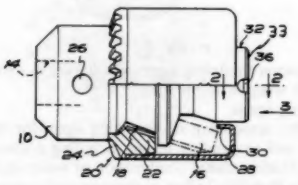
George C. Derbyshire, Sheffield, England, assignor to The Jacobs Manufacturing Company, Limited, Sheffield, England

Filed Jan. 31, 1986, Ser. No. 824,411

Claims priority, application United Kingdom, Feb. 12, 1985, 8503530

Int. Cl.[4] B23B *31/12*; B23P *11/00*

U.S. Cl. 279—62 4 Claims



1. A drill chuck including a body part (10) having an axially extending bore (14) for the reception of a drill shank; three equally spaced bores diverging from the axially extending bore for the reception of respective jaws (16); a nut member (22) rotatably mounted on the body part and located in a circumferential groove (18) in the body part (10) to have screwthreaded engagement with the jaws; a bevel gear element (24); a generally cylindrical sleeve (28) connected to the bevel gear element (24) and extending rearwardly of the body part (10) to rotatably engage a cylindrical portion (32) of the body part having a surface (33), and abutment means provided at that end of the body part on which the generally cylindrical sleeve (28) is rotatably engaged to hold the sleeve in position relative to the bevel gear element (24), characterized in that the abutment means include a plurality of localized swellings (34) formed at the surface (33) of the cylindrical portion (32) of the body part which is engaged by the generally cylindrical sleeve (28), the localized swellings (34) having been produced by plastic deformation of metal longitudinally of the body part (10).

4,684,140

EXTENDIBLE ROLLER SKATE

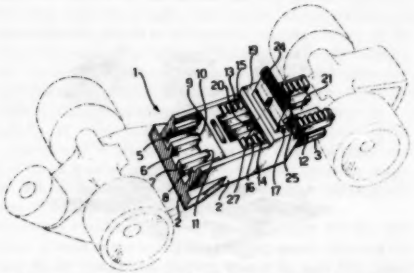
Oliviero Olivieri, Montebelluna, Italy, assignor to Icaro Olivieri & C. S.p.A., Treviso, Italy

Continuation of Ser. No. 551,558, Nov. 14, 1983, abandoned. This application Jun. 27, 1986, Ser. No. 880,646

Claims priority, application Italy, Nov. 24, 1982, 23528/82[U]

Int. Cl.[4] A63C *17/02*

U.S. Cl. 280—11.26 7 Claims



1. A roller skate extendible in its length direction and including a support structure formed by two parts which are coupled together for mutual telescopic movement in said length direction of the skate, and fixing means for securing said parts in fixed mutual positions corresponding to a desired length of said skate, said fixing means comprising:

a plurality of notches extending transverse to said length direction on at least one section of one of said parts;

a cross member affixed to the other of said parts and extending as a bridge transverse to the length direction of said skate, said cross member including an aperture extending therethrough;

a guide mounted on one of said parts and extending through said aperture;

a tooth member having a surface with at least one tooth slidably mounted on said guide and being adapted to be inserted into said aperture for engaging said plurality of notches to prevent telescopic movement between said two parts or retracted through said aperture to permit telescopic movement between said two parts;

resilient bias means for urging said tooth member away from said plurality of notches, said resilient bias means contacts and exerts pressure against said surface; and

a cam lever operatively connected to said guide for selectively manually positioning said tooth member in a first position wherein said tooth member is lockingly inserted through said aperture and in engagement with said plurality of notches for preventing telescopic movement between said two parts or in a second position for enabling said resilient biasing means to bias said tooth member away from said plurality of notches to permit telescopic movement between said two parts;

whereby forces acting to disengage said two parts are applied directly to said cross member for ensuring operative engagement of said two parts when in the locked condition.

4,684,141

PORTABLE CART

Tadao Nunokawa, 252 Fairview Ave., Cedar Grove, N.J. 07009

Filed Mar. 12, 1986, Ser. No. 839,471

Int. Cl.[4] B62B *1/04*

U.S. Cl. 280—40 8 Claims

1. A portable cart for carrying luggage, comprising:

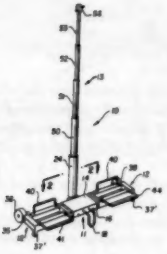
a central section having an upper portion and a rear portion,

a handle section detachably connected to the rear portion of the central section, said handle section being formed of a plurality of elongated rods telescopically connected to each other so that when the handle section is used, the

rods are extended upwardly from the central section to orient in order from a rod having a largest diameter to a rod having a smallest diameter,

two side sections pivotally connected to the central section respectively, each side section having upper and rear portions, and at least one wheel rotationally connected to the rear portion of the side section, and

means for holding the side sections horizontally so that the upper portions of the side sections and the upper portion of the central section are substantially located on the same plane, said holding means, when released, allowing said side sections to rotate relative to the central section so that the side sections are substantially oriented perpendicular



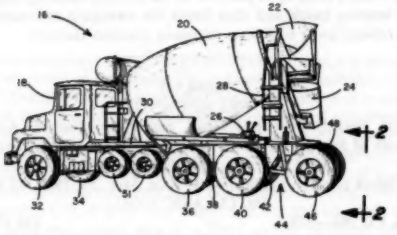
to the central section and parallel to each other, said holding means comprising first engaging devices fixed to the central section, second engaging devices fixed to the respective side sections, said second engaging devices engaging the first engaging devices when assembled to form a luggage support plane on the upper portions of the central section and the two side sections, and at least one spring device situated in the central section, said spring device urging the side sections outwardly so that when the first and second engaging devices are engaged together, the second engaging devices on the side sections do not accidentally disengage from the first engaging devices.

4,684,142

STEERABLE AUXILIARY AXLE

Ronald E. Christenson, Mantorville, Minn., assignor to McNeilus Truck and Manufacturing, Inc., Dodge Center, Minn.

Filed Apr. 3, 1986, Ser. No. 847,744
Int. Cl.[4] B60G *17/00*; B60S *9/12*; B62D *61/12*
U.S. Cl. 280—81 R **17 Claims**



1. In combination with a wheeled vehicle including a chassis and a support frame integral with the chassis; and auxiliary axle frame having a generally longitudinally extended stem, and first and second opposed legs extended longitudinally away from the stem and diverging transversely from one another, with the legs at their distal ends adapted to support wheels; and a pivot means for mounting the stem with respect to the support frame for rotation about a first transverse axis:

a control apparatus for pivoting said auxiliary axle frame, with respect to the support frame, between and operating position with said wheels contacting the ground beneath the vehicle, and a raised position wherein the wheels are spaced from the ground; said control means including:

a pneumatic load spring means supported between said axle frame and a load bearing portion of said support frame and extensible to force said axle frame away from said load bearing portion to the operating position;

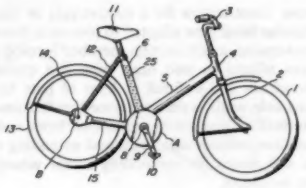
a lift member mounted on said support frame to pivot with respect to said frame, a linking means mounted at its opposite ends to said lift member and said axle frame, and a pneumatic lift spring means supported between a lift portion of said support frame and said lift member, and extensible to force said lift member to pivot away from said lift portion thereby causing said linking means to move said axle frame to the raised position.

4,684,143

TWO-WHEELED VEHICLE WITH HYDRAULIC TRANSMISSION

Yasunori Sato, 2-1-607, Ohkura 1-Chome, Setagaya-Ku, Tokyo, Japan

Filed Mar. 27, 1986, Ser. No. 844,549
Claims priority, application Japan, Apr. 5, 1985, 60-71065
Int. Cl.[4] B62M *19/00*
U.S. Cl. 280—216 **10 Claims**



1. A two-wheeled vehicle comprising:

a driving system having an input portion and an output portion;

a variable displacement fluid pump provided at said input portion of the driving system, said variable displacement fluid pump being a radial plunger pump whose plungers are driven by a cam assembly, an eccentricity of said cam assembly being adjustable, said cam assembly comprising:

an inner eccentric cam substantially in the shape of a cylinder eccentrically fixed to a center shaft and an outer eccentric cam substantially in the shape of a cylinder snuggly, rotatably and eccentrically fitted on the inner eccentric cam;

said plunger pump comprising:

eccentricity control means for changing the eccentricity of the eccentric cam assembly, said eccentricity control means comprising:

an inner internal gear integral with said inner eccentric cam and having a center coincident with said center shaft;

an outer internal gear rotatable together with said outer eccentric cam and having the same number of teeth and the same pitch diameter as those of said inner internal gear and located side-by-side, concentric to, and rotatable relative to said inner internal gear;

a center gear rotatable on said center shaft;

a fixed gear rotatable on a fixed member and meshing with said center gear and one of said internal gears; and

a rocking gear rotatable on a free end of a rocking arm which is rotatably supported by said center shaft and meshes with said center gear and the other of said

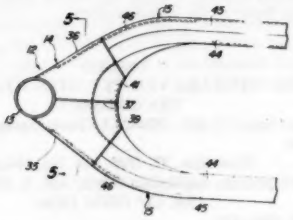
internal gears, thereby adjusting the eccentricity of said eccentric cam assembly in a stepless manner by rocking said rocking arm; and

a fixed displacement fluid motor provided at said output portion of the driving system, said fluid pump and motor being connected through hydraulic passages, thereby driving the vehicle.

4,684,144
FRAME BODY OF MOTORCYCLE

Toshio Tanaka, Hamamatsu, Japan, assignor to Yamaha Motor Co., Ltd., Iwata, Japan

Filed Mar. 14, 1986, Ser. No. 839,796
Int. Cl.[4] B62R *19/32*
U.S. Cl. 280—281 R **6 Claims**

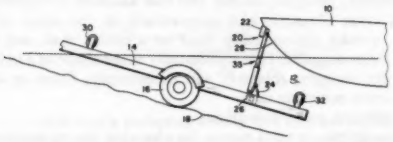


1. A frame construction for a motorcycle or the like comprising a tubular head pipe adapted to journal a front wheel for steering movement, a box section member formed from sheet metal pieces affixed to said head pipe and extending rearwardly therefrom and defined at least in part by a pair of spaced apart side walls, a pair of formed main frame members having side walls aligned with, separated from and affixed to said box section member side walls and extending rearwardly therefrom, and means for suspending a rear wheel from said main frame members.

4,684,145
BOAT GUIDE

William C. Tingley, 910 S. Louisville, Tulsa, Okla. 74112

Filed Sep. 3, 1985, Ser. No. 772,033
Int. Cl.[4] B60P *3/10*
U.S. Cl. 280—414.1 **12 Claims**



1. A boat trailer having a longitudinal center line from front to back which comprises:

a trailer having a boat receiving frame and which has a front, a rear end, a first side and a second side spaced from said first side;

only one set of posts consisting of a first post and a second post;

first pivot means having an axis perpendicular to said longitudinal center line and connecting said first post to the first side of said frame toward the rear end thereof;

second pivot means having an axis perpendicular to said longitudinal center line and connecting said second post to the second side of said frame near the rear end thereof;

a first cross-member connecting the upper ends of said first and second posts;

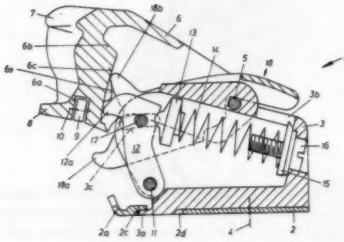
biasing means for continually urging said first and second posts about said first pivot means and said second pivot means, respectively, toward upright position with respect to said frame;

a keel receiving cradle support by said cross-member.

4,684,146
HEEL HOLDER

Friedrich Leichtfried, Traiskirchen; Hubert Wuerthner, Hainburg, and Alois Himmetsberger, Vienna, all of Austria, assignors to TMC Corporation, Baar, Switzerland

Filed Dec. 18, 1985, Ser. No. 810,640
Claims priority, application Austria, Dec. 19, 1984, 4018/84
Int. Cl.[4] A63C *9/084*
U.S. Cl. 280—626 **6 Claims**



1. A heel holder, comprising: a base plate; a bearing block which is supported on the base plate, the bearing block having in an upper region thereof a swivel axle which pivotally supports a binding housing having down-holding means and a stepping spur, and the bearing block having in a lower region thereof a further swivel axle which pivotally supports a control lever which slidably engages a control element of the binding housing and is biased by a release spring which can be adjusted in its initial tension; and a two-arm release lever which is pivotally supported on a swivel axle provided on the control lever and which has on a load arm thereof an upper extension and a lower extension, the lowr extension being engageable with a projection on the binding housing and the upper extension serving as a stop for limiting upward swinging of the binding housing; wherein the swivel axle for the release lever extends through two arcuate slotted holes which are porvided in sidewalls of the bearing block and which have their centerpoints on a centerline of the swivel axle for the control lever; wherein the release lever carries a first stop which, in cooperation with a counterstop arranged on one of the binding housing and the bearing block, limits a releasing movement of the release lever; and wherein the release lever carries a second stop which, in an open position of the binding housing, engages the bearing block and thus limits the swinging movement of the release lever toward a releasing position thereof.

4,684,147
SKI BINDING

Roger Pascal, Annecy-le-Vieux, and Pierre Rullier, Annecy, both of France, assignors to Salomon S.A., Annecy, France

Filed Mar. 30, 1984, Ser. No. 595,299
Claims priority, application France, Mar. 31, 1983, 83 05309
Int. Cl.[4] A63C *9/085*
U.S. Cl. 280—628 **116 Claims**

1. A safety binding for holding a boot on a ski, and releasing the boot in response to an external force applied to the binding, wherein said boot is adapted to hold a leg of a skier therein, wherein said binding comprises:

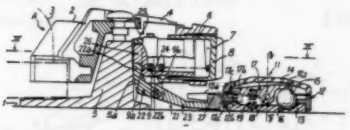
(a) a maintenance element for releasably holding said boot on said ski, wherein said maintenance element is adapted to be displaced to release said boot;

(b) means for biasing said maintenance element against the release of said boot, wherein said biasing means produces

a release threshold above which said maintenance element releases said boot in response to an external force on said binding above said release threshold; and

(c) non-electronic means for selectively increasing said bias of said maintenance element against the release of said boot as a function of the duration of magnitude of said force, wherein said bias increasing means comprises:

(i) means for being displaced between rest and operating positions, wherein in said rest position said means for being displaced permits displacement of said maintenance element when said external force on said binding is greater than said release threshold;



(ii) means for displacing said means for being displaced into said operating position in response to a shock to said leg; and

(iii) means for increasing said release threshold in response to positioning said means for being displaced into said operating position so that said maintenance element releases said boot only when said external force is greater than said increased release threshold.

4,684,148

PERAMBULATOR

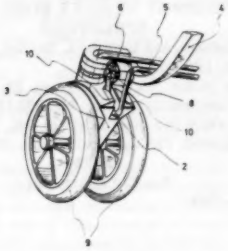
Dieter Gläser, Dachau, Fed. Rep. of Germany, assignor to PEG Perego-Pines S.p.A., Italy

Filed Mar. 3, 1986, Ser. No. 835,536

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 33532594

Int. Cl.[4] B60B *33/02*

U.S. Cl. 280—647 **12 Claims**



1. A perambulator comprising a collapsible frame, a pushing handle mounted on said frame for pushing the perambulator in a travel direction, four spaced apart wheel sets mounted to said frame, at least two of said wheel sets at one end of said frame each having an axle support mounted for swivelling about a vertical swivel axis to said frame, each axle support having a recess therein, said at least two wheel sets each having at least one wheel rotatably mounted to its axle support, locking means for engaging said at least two wheel sets for locking each of said at least two wheel sets in a fixed swivel position, said locking means comprising a locking lever for each of said at least two wheel sets, pivotally mounted to said frame between a locking position for engaging into the recess of one of said axle supports to hold the wheel set of that axle support in its fixed swivel position, and an unlocking position spaced away from the recess, each lever having an intermediate dead center position between its locking and unlocking positions, said locking means including a locking bar connected between said levers for each of said at least two wheel sets for pivoting said levers at the same time between their locking and unlocking positions, a pair of lateral ramps connected to each axle support on each side of said recess thereof, each lateral ramp being inclined upwardly in a direction toward said recess to form an opening therebetween into said recess, each ramp being engageable against one of said locking levers with said one locking lever in its locking position when the wheel set of that locking lever is out of its fixed swivel position and as the wheel set moves toward its fixed swivel position to initially move the lever away from the recess until the lever reaches the opening of the recess, and biasing means engaged against each lever for biasing each lever away from its dead center position to bias each lever away from its recess with each lever in its unlocking position, and into its recess with each lever in its locking position, said ramps engaging against said levers with swivelling of said wheel sets for urging said levers in a direction away from the biasing force of said biasing means.

4,684,149

COLLAPSIBLE WHEELCHAIR AND WHEELCHAIR STRUCTURE

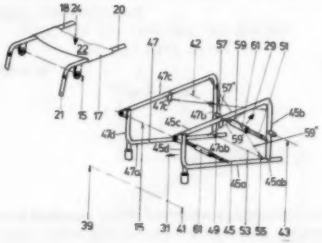
Bruno Meyer, Wohlen, Switzerland, assignor to Valutec AG, Dottikon, Switzerland

Filed May 21, 1985, Ser. No. 736,439

Claims priority, application Switzerland, May 21, 1984, 2494/84

Int. Cl.[4] B62M *1/14*

U.S. Cl. 280—650 **24 Claims**



1. Collapsible mobile wheelchair structure, comprising

a support frame or chassis (**11**) including two substantially rigid side frame elements (**45, 47**) each having two support wheels coupled thereto;

collapsible spreader braces (**24, 49, 51**) movably connected to said side frame elements and, when in a straight condition, maintaining the side frame elements at a predetermined distance from each other to define a use condition, while permitting, upon collapse of the spreader braces, folding of the side frame elements towards and close to each other, said collapsible spreader braces including means for permitting a limited amount of twisting movement of said side frame elements relative to each other substantially in the planes of said side frame elements when said collapsible spreader braces are in said straight condition to define said use condition, and said collapsible spreader braces (**24, 49, 51**) including brace elements (**48, 52**) and a collapsing joint (**50, 61**) connecting and attaching said brace elements together, said collapsing joint maintaining said brace elements, selectively, in essentially aligned position, while permitting collapsing of the brace elements towards each other;

a collapsible seat (**22**) secured to each of the side frame elements; and

at least one tension cable means (**53**; **57'**, **57''**, **59**, **59''**) connecting the side frame elements (**45, 47**) together,

said at least one tension cable means comprising at least one pair (**57, 59**) of flexible elongated tension cables each being diagonally connected between opposite side frame ele-

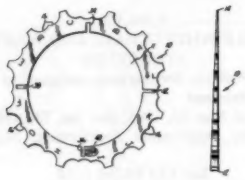
ments (45, 57) to apply compressive forces to said spreader braces when said spreader braces are in said straight condition, said tension cable means permitting said twisting movement of one of said side frame elements relative to the other side frame element even when said support wheels are on an uneven support surface, thereby providing solid support on an uneven support surface.

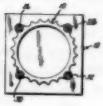
4,684,150

APPARATUS FOR ADJUSTING CAMBER AND TOE

John Specktor, Golden Valley, and Gerald A. Specktor, St. Paul, both of Minn., assignors to Shim-A-Line, Inc., Minneapolis, Minn.

Filed Oct. 31, 1983, Ser. No. 546,848
Int. Cl.[4] B62D *17/00*
U.S. Cl. 280—661 **10 Claims**





1. In combination, a wheel assembly attached to an end of an axle assembly of a motor vehicle, the wheel assembly being attached to the axle assembly by a plurality of bolts parallel to and substantially equidistantly spaced from an axis of the wheel assembly but unequally from each other, a shim device for adjusting camber and/or toe of the wheel assembly, the shim device comprising: a relatively flat, tapered plate having a peripheral surface with a plurality of outwardly facing irregularly spaced bolt-engaging notches in excess of the number of bolts used to attach the wheel assembly to the axle assembly, the plate being installable between the axle and the wheel without complete removal of all the bolts and the plate having a sufficient diameter so that the bolt-engaging notches engage the bolts to retain the plate in position, and the bolt-engaging notches being circumferentially positioned so that the plate can be retained in any one of a plurality of closely spaced angular positions with respect to the bolts, the plate having a plurality of indexing indicia thereon to indicate when the plate is in the desired angular position.

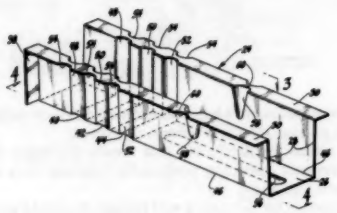
4,684,151

CONTROLLED COLLAPSIBLE FRAME RAIL

David F. Drewek, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 21, 1986, Ser. No. 842,239
Int. Cl.[4] B62D *21/00*
U.S. Cl. 280—784 **4 Claims**

1. An elongated vehicle body structural member which collapses longitudinally in a controlled manner when subjected to longitudinal impact loads applied against an impacted end thereof, comprising, in combination, a generally U-shaped member including a base wall having inner and outer surfaces and a side wall extending generally laterally to each side edge of the base wall and having inner and outer surfaces respective to the inner and outer surfaces of the base wall and a lateral flange at the free edge thereof, the base wall including a plurality of shallow depressions extending inwardly from the inner surface thereof, said depressions being located transversely of the base wall between the side walls, each side wall having a depression therein which is respective to and forms a continuation of a depression in the base wall, the depressions in the side walls extending outwardly from the inner surface whereby the depression in the side wall extend opposite to the depression in the base wall from respective surfaces, the depressions in the



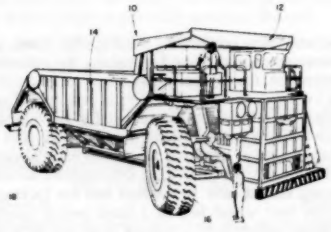
base wall and the side walls located most adjacent the impacted end of the structural member having a depth greater than the depressions in the base wall and side walls located most remote from the impacted end of the structural member to ensure that the structural member collapses from the impacted end thereof with the depressions most adjacent the impacted end collapsing before the depressions most remote from the impacted end, and a notch in the flange of each side wall located opposite a depression therein to permit collapse of the flange with each such depression, each notch being of a depth to bar securement of the flange to a vehicle body member between each notch and a respective side wall.

4,684,152

OFF-HIGHWAY VEHICLE BODY SUPPORT STRUCTURE

Edgar R. Goodbary, and Francis A. Bartley, both of P.O. Box 100, Cardin, Okla. 74335

Continuation of Ser. No. 068,167, Aug. 20, 1979, abandoned, which is a continuation of Ser. No. 875,192, Feb. 6, 1978, abandoned, which is a division of Ser. No. 744,429, Nov. 23, 1976, abandoned. This application Aug. 20, 1981, Ser. No. 236,299
Int. Cl.[4] B62D *21/12*
U.S. Cl. 280—785 **2 Claims**



1. In an off-highway vehicle, a body support structure comprising upstanding non-pivoted front A-frame means, transversely extending front torque tube means disposed in spaced relation above and supported by said front A-frame means, rear A-frame means, and transversely extending rear torque tube means disposed in spaced relation above and supported by said

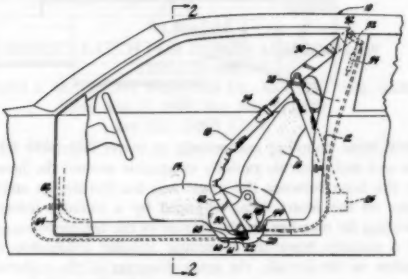
rear A-frame means and supported therefrom, said front and rear torque tube means carrying all of the loads of the vehicle for efficient distribution of the load to the front and rear A-frame means.

4,684,153

EASY ACCESS SEAT BELT SYSTEM

Larry D. Miller, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 9, 1986, Ser. No. 849,846
Int. Cl.[4] B60R *21/10*
U.S. Cl. 280—808 **6 Claims**



1. A seat belt system for the front seat of a coupe vehicle having the front seat back forwardly pivotable to enable occupant ingress and egress to the rear seat through the door opening comprising:

a seat belt having a lap belt end anchored on the floor outboard the seat and a shoulder belt end anchored on the body rearward the door opening;

a lap belt positioning sleeve associated with the lap belt end and pivotally mounted on the body for movement between a forward position routing the belt across the occupant lap and a rearward position lying horizontally along the floor to dispose the lap belt at a position facilitating occupant ingress and egress;

a shoulder belt positioning sleeve associated with the shoulder belt end and pivotally mounted on the body for movement between a forward position routing the belt across the occupant upper torso and a rearward position lying vertically rearwardly of the door opening to dispose the shoulder belt at a position facilitating occupant ingress and egress;

and means independent of the seat belt interconnecting the sleeves and adapted to coordinate the pivotal movement therebetween such that movement of either of the sleeves to a selected one of the forward or rearward positions thereof will effect simultaneous movement of the other of the sleeves to the selected position.

4,684,154

CLIPBOARD FOR ONE-WRITE CHECK WRITING AND RECORDING SYSTEMS

Eric R. Hayman, Warren, N.J., and Scott R. Penniman, Springhouse, Pa., assignors to Shaw/Walker Company, Millburn, N.J.

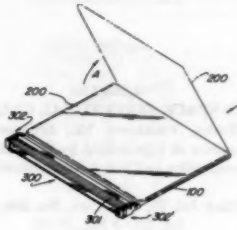
Filed Feb. 13, 1986, Ser. No. 829,372
Int. Cl.[4] B41L *3/00, 3/06*
U.S. Cl. 282—29 R **14 Claims**

1. A clipboard for holding a plurality of sheets having positioning means along one edge thereof for aligning and positioning said sheets on said clipboard, said clipboard comprising:

base means for supporting said sheets and receiving said positioning means of said sheets;

clamping means above said base means for holding said sheets on said base means;

at least one pivot means mounted on said base means and operatively connected to said clamping means for controlling the movement of said clamping means parallel to said base means and for controlling the movement of said clamping means toward and away from said base means; and



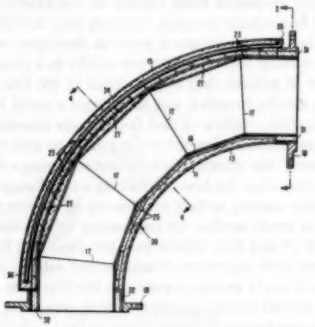
first biasing means adjacent said clamping means for urging against said clamping means and causing said clamping means to rotate at said pivot means.

4,684,155

PIPE ELBOW WITH ABRASION RESISTANT COMPOSITE INNER LINER AND METHOD FOR FORMING

Thomas E. Davis, Anderson, Ind., assignor to Cerline Ceramic Corporation, Anderson, Ind.

Filed Apr. 11, 1986, Ser. No. 850,588
Int. Cl.[4] F16L *58/14*
U.S. Cl. 285—16 **15 Claims**



1. An apparatus, comprising:

a pipe elbow defining a tubular shaped flow passageway for allowing the transmission of abrasive materials therethrough, said pipe elbow including an outer casing having an inner surface, said pipe elbow further including a sacrificial liner and an inner wear liner lining the entire inner surface of said outer casing, said sacrificial liner spaced inwardly from said outer casing and defining said flow passageway, said inner wear liner having a substantially greater wear resistance to abrasive material flowing therethrough than said outer casing, said inner wear liner including a castable mixture of wear resistant particles and binder cast in the space between said outer casing and said sacrificial liner, said inner wear liner further including no more than four series of abrasion resistant polyhedron shaped wear bricks encased within said castable mixture and arranged along the length of said pipe elbow, said wear bricks having a planar shaped surface which faces in a direction generally towards the center line of said pipe

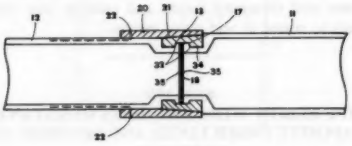
elbow, said mixture of wear resistant particles and binder extending entirely around said flow passageway.

4,684,156

PRELOADED SPACE STRUCTURAL COUPLING JOINT

Marvin D. Rhodes, Yorktown, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 30, 1986, Ser. No. 890,445
Int. Cl.[4] F16L *21/06*
U.S. Cl. 285—27 8 Claims



1. A coupling joint for tubular members of truss structures comprising:

a first tubular member having a first end and a second end, the first end having a bell flange with a flat, annular mating surface and having an inverse radial taper on its inside surface displaced from normal to the axial alignment of said first tubular member, wherein said first tubular member has two longitudinal grooves machined into the outside surface thereof which run axially to a location spaced from an annular split ring attached to the first end of said first tubular member, and then begin a spiral 180° around the outside surface of said first tubular member;

a second tubular member to be joined to said first tubular member, the second tubular member having a first end and a second end, the first end having a bell flange with a flat, annular mating surface and having an inverse radial taper on its inside surface corresponding to said inverse radial taper of said first tubular member displaced from normal to the axial alignment of said second tubular member;

means to apply mating pressure to the first ends of said first and second tubular members, which comprises the annular split ring having an inner recess on the inside circumferential surface with a tapered radial wall displaced from normal to the axial alignment of said first and second tubular members, the annular split ring bifurcated radially into identical halves, each attached with attachment means to one of the first ends of said first and second tubular members;

means to lock said first and second tubular members in operative coupled relationship, consisting of an annular sleeve with two guide pins attached normal to the axial alignment of said first and second tubular members, and protruding inwardly from the inside surface of the sleeve, with the sleeve in slidable relationship to the outside diameter of said first tubular member, so that the sleeve is first guided axially by the pins in correspondence with the grooves to a position around the coupled first and second ends of said first and second tubular members, and is then guided in rotation as the guide pins traverse along the spiral of the grooves;

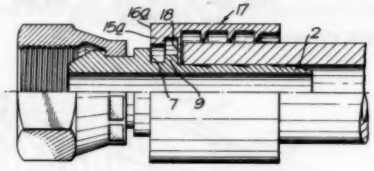
whereby said first and second tubular members are affixed in axial alignment with no free play.

4,684,157

HOSE COUPLING

Richard D. Smith, Yorkshire, England, assignor to Internationale Octrooi Maatschappij "Octropa" BV, Netherlands

Filed Mar. 30, 1982, Ser. No. 363,529
Claims priority, application United Kingdom, Mar. 30, 1981, 8109882; Jan. 11, 1982, 8200646
Int. Cl.[4] F16L *33/20*
U.S. Cl. 285—256 4 Claims



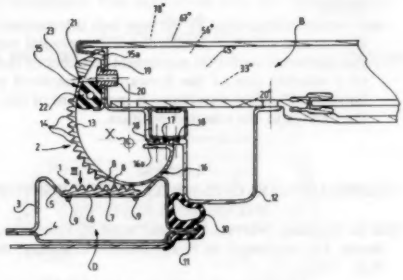
1. A hose coupling comprising an insert insertable into a hose end and a ferrule radially swageable around the hose to grip the hose between the insert and the ferrule, an annular recess on the insert being engaged by a radially inwardly extending lip member on the ferrule as the ferrule is swaged, and a radially inwardly extending annular collapsible stop member on the ferrule, the inner diameter of the collapsible stop before swaging being less than the maximum diameter of a radially outwardly extending abutment on the insert to locate the ferrule longitudinally with respect to the insert, the difference between the inner diameter of the stop and the diameter of the insert adjacent the abutment being less than the difference in an outer ferrule diameter before and after swaging, and a radially inwardly extending hose stop on the ferrule being adapted to be contacted by the radial end face of the hose to maintain the aforesaid location prior to swaging.

4,684,158

DEVICE FOR RETAINING A DOOR IN OPEN POSITION

André L. Miclot, Maurepas-Village, France, assignor to Automobiles Peugeot and Automobiles Citroen, both of, France

Filed Dec. 9, 1985, Ser. No. 806,762
Claims priority, application France, Dec. 26, 1984, 84 19818
Int. Cl.[4] E05C *19/02*
U.S. Cl. 292—76 14 Claims



1. An assembly, comprising:

a door or leaf member (B),

a post member (D), and

a device for retaining said leaf member in open position,

said post member (D) comprising a flat wall (6), and

said leaf member (B) pivotally mounted about an axis of rotation (X) thereof,

wherein said device comprises

a first toothed surface (7) made of a resilient material and fastened to said flat wall (6) of said post member (D), said

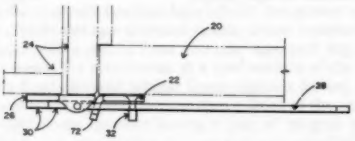
first toothed surface arranged in a plane which is substantially vertical and parallel to said axis of rotation (X), and a second toothed surface (13) made of a resilient material and fastened to said leaf member (B) along substantially an arc of a circle surrounding said axis of rotation (X) and positioned to mesh with said first toothed surface (7) as said leaf member (B) is pivoted about said axis of rotation (X), said first and second toothed surfaces having a relative position and extent such that the number of teeth (14) of said second toothed surface (13) meshing with the teeth (8) of said first toothed surface (7) increases as an angle of opening of said leaf member (B) becomes greater so as to provide a corresponding increase of door leaf retaining force.

4,684,159

SAFETY LATCH FOR DOORS AND SIMILAR STRUCTURES

Romuald J. Hutter, 561 Weymouth Ct., Anaheim, Calif. 92807

Filed Aug. 5, 1985, Ser. No. 762,219
Int. Cl.[4] E05B *17/16*
U.S. Cl. 292—268 **9 Claims**



1. A safety latch for a door or other movable first structure, which is mounted in a second structure forming a frame and which is arranged to open at one side and to pivot at the opposite side, the latch having first structure and second structure mounted elements which are adapted to be interengaged to permit partial opening of the movable structure without latch disconnection, and which comprise:

a first one-piece stamped metal element having (a) a flat portion adapted to be secured against the second structure and (b) two spaced integral flanges which extend substantially at right angles from the flat portion and which constitute pivot-providing flanges;

a second one-piece stamped metal element having two elongated flat side bars which are separated by an elongated slot, and which are connected at one end and open at the other end, the side bars of the second element being pivotally engaged with the pivot-providing flanges of the first element, and the second element having sufficient resilience to (a) permit temporary deflection of the open ends of the side bars to bring them into such pivotal engagement and (b) subsequent springing back to retain them in their pivotally engaged position; and

a third metal element having a portion adapted to be secured to the first structure and a runner portion extending at an angle to the first structure, the runner portion having a stem which is movable in the elongated slot of the second element and a head which is wider than the slot in order to prevent disengagement of the second and third elements after they have been moved into interengaging positions.

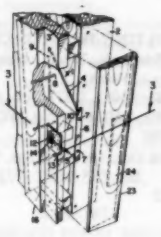
4,684,160

DOOR SECURITY DEVICE

Gordon J. Nelson, 1143 Sims, Apt. 3, Dickinson, N. Dak. 58601

Filed Aug. 14, 1985, Ser. No. 765,855
Int. Cl.[4] E05C *21/02*
U.S. Cl. 292—340 **3 Claims**

2. A door security device comprising a plate affixed to a wall support member adjacent to a door which resides along the same plane as the wall, the plate being formed as a traperzoid having a short parallel side, the plate having a lip formed integrally along the short parallel side; the lip being attached to the wall by means of threaded fasteners passing through mounting holes within the lip; a striker channel affixed to the plate, the striker channel being formed as a polyhedron, the polyhedron extending perpendicularly from the plate such that the striker channel is aligned with a strike plate which mates with an existing door lock plunger, the striker channel having



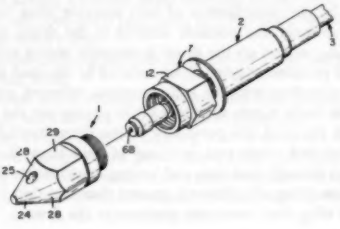
a length sufficient to permit the strike plate to be interconnected with the plate, the plate being attached to a wall support member, the wall support member also serving as the foundation door the door jamb; and wherein, when the door is closed, said lock plunger passes through said strike plate in said door jamb, thereby engaging the striker channel.

4,684,161

FRANGIBLE PULLING BULLET

Walter A. Egner, Oberlin, and Daniel R. Collins, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 764,270, Aug. 9, 1985, abandoned. This application Nov. 21, 1986, Ser. No. 935,062
Int. Cl.[4] F16G *11/10;* **B65H** *59/00*
U.S. Cl. 294—1.1 **11 Claims**



1. An optical cable assembly comprising:

an optical cable containing an optical fiber,

an optical connector assembled to the optical cable and encircling a signal transmitting end of the optical fiber,

and a pulling bullet for pulling the optical cable and the optical connector along a passage,

the optical connector including coupling means for disconnect coupling of the optical connector to the pulling bullet,

the pulling bullet having a covering means surrounding the signal transmitting end of the optical fiber,

the optical connector and the pulling bullet being coupled to each other and providing spacing means for spacing the covering means from the signal transmitting end of the optical fiber and preventing abrasion thereto,

the pulling bullet having securing means for securing a hauling means for pulling the pulling bullet along a passage,

a junction of the optical cable and the optical connector having a tension force limit,

the optical cable having a tensile strength, and

the securing means having a frangible means with a breaking

strength less than said tension force limit and less than said tensile strength for breaking and separating from the hualing means thereby protecting the optical cable and the optical connector from damage.

4,684,162

TILTING HOIST TACKLE

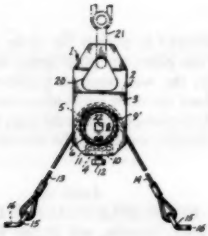
David L. Butler, Edmonds, Wash., assignor to Oberg Enterprises, Inc., Everett, Wash.

PCT No. PCT/US85/02481, § 371 Date Apr. 25, 1986, § 102(e) Date Apr. 25, 1986, PCT Pub. No. WO87/03570, PCT Pub. Date: Jun. 18, 1987

PCT Filed Dec. 13, 1985, Ser. No. 867,186

Int. Cl.[4] B66C *1/12*

U.S. Cl. 294—82.12 **8 Claims**



1. Tilting hoist tackle for connection between a hoist and a load to be lifted, including a drum, a block adapted to be connected to the hoist and mounting the drum for rotation about a horizontal axis and locking means for deterring rotation of the drum but releasable to permit such rotation, characterized by the combination of two separate sling lines each having an inner end porition secured to the drum, said sling lines being wound on the drum in opposite senses and having free end portions adapted to be secured to the load at spaced locations so that, with the locking means released, rotation of the drum hauls in one sling line while paying out the other so as to tilt the load, the periphery of the drum having narrow slots and said inner end portions of said sling lines being threaded through said slots and having knobs inside the drum, said knobs being of a diameter greater than said slots for securing said sling lines inner end portions to the drum.

4,684,163

STRAP ASSEMBLY FOR SECURING AND TRANSPORTING MAIL

Richard T. Anderson, 1614 Morris Ct., North Wales, Pa. 19454

Filed May 27, 1986, Ser. No. 867,210

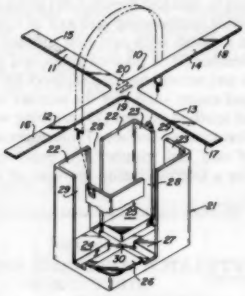
Int. Cl.[4] B65D *63/16*

U.S. Cl. 294—149 **9 Claims**

1. A device for receiving, securing and carrying a stack of mail or the like which comprises:

(1) two essentially flat elongated straps transversely disposed to one another in a perpendicular arrangement so that mail can be stacked thereon at the point of intersection, one strap having a length sufficient to extend around said stack in one direction and the second strap having a length sufficient to extend around said stack in a transverse direction;

(2) securing means of the hook and loop type bonded to end segments of each strap on opposing surfaces so that their respective end segments can be joined together to form a stack-securing loop; and



(3) handle means for carrying the stack thus secured, said handle means being centrally disposed at the point of intersection of said straps.

4,684,164

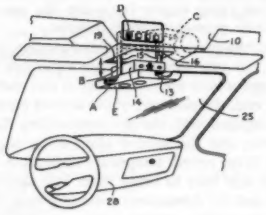
APPARATUS FOR HOUSING AND DEPLOYING A RADAR DETECTOR IN AN AUTOMOTIVE VEHICLE

Timothy N. Durham, Rte. 8, Box 153, Conway, S.C. 29526

Filed Oct. 27, 1986, Ser. No. 923,415

Int. Cl.[4] B60R *7/04*

U.S. Cl. 296—37.7 **7 Claims**



1. Apparatus for housing a radar detector between the roof and ceiling of an automotive vehicle and for deploying the radar detector in operable position comprising:

a support for said radar detector;

means carrying said support for movement from a retracted position between the roof and ceiling to a position below the ceiling wherein the said radar detector is in operable position;

electrically operated means moving said means carrying said support from said retracted position to said position below the ceiling and for returning said support to said retracted position; and

switch means actuating said electrically operated means for moving the support from retracted position to said position;

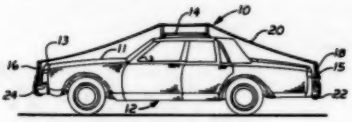
whereby said radar detector may be readily moved and stored out of sight when the automotive vehicle is not in operation and returned to operable position.

4,684,165

MOTOR VEHICLE SUN SCREEN APPARATUS

Charles E. Becker, 5796 Ulmerton Rd. #405, Clearwater, Fla. 33520

Filed Dec. 15, 1986, Ser. No. 941,910
Int. Cl.[4] B60J *7/20*
U.S. Cl. 296—136 **7 Claims**



1. A portable sun screen cover apparatus for an automotive vehicle body capable of being stored on a roof rack comprising in deployed sun screening mode:

(a) a cover of sufficient length and width with front, rear and side edges to overlay a top surface of the vehicle and having a plurality of reinforced spaced holes adjacent the edges;

(b) the roof rack having a base tubular component connected to front and rear elevated tubular frame components integral with a pair of front and rear legs, each leg ending in a means for attachment to a roof surface of the vehicle;

(c) a front elevated tubular frame member having a heighth and width slightly greater than a front of the vehicle, the front frame member having a pair of integral depending legs each terminating in a suction cup attached to a top surface of a front bumper of the vehicle;

(d) a rear elevated tubular frame member having a heighth and width slightly greater than a rear of the vehicle, the rear frame member having a pair of integral depending legs each terminating in a suction cup attached to a top surface of a rear bumper of the vehicle;

(e) the cover draped to overlay the roof rack frame components, the front frame member and the rear frame member, and

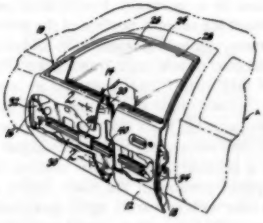
(f) elastic tie-down members engaged to two or more of the holes on each front and rear edge of the cover and elastically stretched to engage a lower edge of the vehicle.

4,684,166

VEHICLE DOOR IMPACT BEAM AND STABILIZING ASSEMBLY

Vinod L. Kanodia, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed May 19, 1986, Ser. No. 864,304
Int. Cl.[4] B60J *5/04*
U.S. Cl. 296—146 **4 Claims**



1. A side door impact beam for use with a vehicle door having inner and outer spaced door panels and fore and aft end walls to define a door well, said impact beam being horizontally disposed within said well and having its opposed ends secured to said door,

said impact beam having a main body which is made from metal of a given thickness and which has upper and lower vertically disposed flanges adjacent the outer door panel, the improvement comprising:

a stabilizing strap located adjacent said outer panel and extending laterally across and along said main body a predetermined distance fore and aft of its midpoint, said strap having its upper and lower sides crimped over said upper and lower flanges so as to engage said flanges along their back sides, respectively,

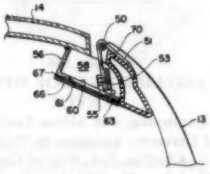
said strap being bendable about its neutral axis and slidable relative to said main body during a side impact which causes the main body to be bowed inwardly of the door and functioning to substantially retain and prevent said flanges from deforming inwardly whereby the load bearing ability of the beam is significantly enhanced as compared to an identical impact beam without the stabilizing strap.

4,684,167

ROOF HINGED DOOR APPARATUS

Ricky L. Newmayer, 14906 So. Figueroa, Gardena, Calif. 90248

Filed Sep. 26, 1986, Ser. No. 911,723
Int. Cl.[4] B60J *5/04;* **E05D** *7/00*
U.S. Cl. 296—202 **15 Claims**



10. A hinge assembly for use with upwardly swingable automobile doors comprising:

a well having a bottom plate carrying spaced apart arcuate side portions and a rear plate, said side portions adapted to mate with a seal;

said plates defining an open hinge cavity at the top and front of said well;

a support plate secured between said side portions at an angle with respect to said bottom plate; and

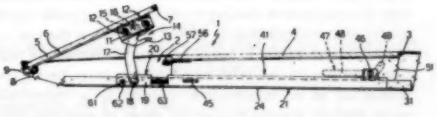
a hinge substantially occupying said well cavity having a pair of hinge plates joined by a hinge pin wherein one hinge plate is secured to said support plate and said other hinge plate extends exteriorly of said well cavity for attachment to the automobile door.

4,684,168

SUN ROOF FOR VEHICLES

Elio Lupo, Turin, Italy, assignor to Gilardini S.p.A., Turin, Italy

Filed Jun. 28, 1985, Ser. No. 750,692
Claims priority, application Italy, Apr. 15, 1985, 53228/85[U]
Int. Cl.[4] B60J *7/22, 7/053, 7/057*
U.S. Cl. 296—217 **11 Claims**



1. A sun roof for vehicles, comprising a main part slidable beneath a roof between first and second positions to respectively close and open a first portion of an aperture in said roof, a front part rotatable between first and second positions to respectively close a second portion of said aperture and substantially prevent direct entry of air in the second portion of

said aperture, and first means operable to initially rotate said front part between said respective first and second positions and subsequently displace said main part between said respective first and second positions, wherein said front part and said main part are disposed at substantially the same height when said front part and said main part are in said respective first positions, and said front part is inclined upwardly relative to said main part when said front part is in said second position, said first means including a first control cable arranged at a first lateral side of the sun roof, a movable control body which controls the positions of said main part and said front part, and a movable auxiliary body having means for engaging said control body, said cable being engaged to said movable control body, and said front part being coupled to first resilient means which urge said front part towards said second position and being thrust into said first position by linking means connected to said auxiliary body during forward movement of said auxiliary body toward the front of said sun roof, said forward movement of said auxiliary body being driven by forward movement of said control body, said main part remaining stationary during movement of said front part between said first and second positions.

4,684,169

SLIDING AND LIFTING ROOF WITH A LOCKING LEVER

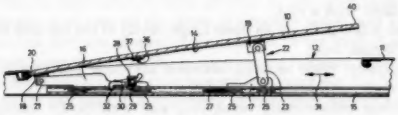
Richard Igel, Germering, and Alfons Lutz, Emmering, both of Fed. Rep. of Germany, assignors to Webasto-Werk W. Baier GmbH & Co., Gauting, Fed. Rep. of Germany

Filed Sep. 25, 1985, Ser. No. 780,030

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1984, 3436044; Dec. 6, 1984, 3444522

Int. Cl.[4] B60J *7/05, 7/19*

U.S. Cl. 296—221 **15 Claims**



1. Sliding and lifting roof for a vehicle having a rigid cover that is slidably guided by way of front and rear guide sleds on a respective longitudinally extending guide rail running at each of opposite lateral sides of an opening of the roof, and said cover also being mounted by way of swivel bearings, disposed in an area of its forward end, for pivotal movement, about an axis running transversely to the length of the guide rails by means of lifting arrangements engaging at the rear guide sleds, from a closed position selectively either so that its rear edge is raised above a fixed portion of the roof or is lowered below the fixed portion of the roof, wherein at least one of the guide rails is provided with a recess with respect to which one end portion of a respective locking lever is disengageable against the action of a resilient biasing means only when the rear edge of the cover is in a fully lowered position for retraction below the fixed portion of the roof, said locking lever being pivotally connected at an intermediate portion to a respective front guide sled for pivotal movement about an axis and being constructed and arranged, relative to one of the cover and a part that is mounted to the cover so as to move in conjunction therewith, for being pivoted about said axis by a force applied to another end portion of said lever by one of said cover and said part into a release position in which the locking lever is rocked out of engagement with the respective guide rail recess when the cover is lowered into its position for retraction.

4,684,170

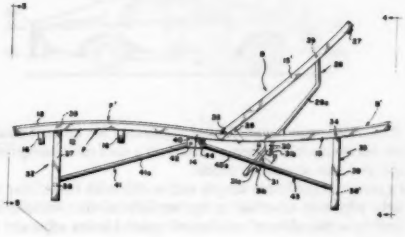
FOLDABLE CHAISE LOUNGE

Donald B. Colby, Sarasota, Fla., assignor to Lee L. Woodard, Inc., Owosso, Mich.

Filed Jan. 9, 1985, Ser. No. 689,872

Int. Cl.[4] A47C *4/44*

U.S. Cl. 297—19 **5 Claims**



1. A chaise lounge frame comprising: a longitudinally disposed, open framework, main frame comprising a rear back support portion integrated with a front leg support portion; a back rest portion having a lower end hingedly supported by the main frame generally intermediate the length of the main frame and pivotal from a longitudinal position generally in the plane of the main frame to a vertically inclined position; a front leg frame, including legs connected by a cross member, hingedly connected to said leg support portion of the main frame generally at the front of the main frame and swingable from a vertical position upwardly to a generally longitudinal position folded toward said leg support portion; a rear leg frame, including legs connected by a cross member, hingedly connected to said back support portion of the main frame generally at the rear of the main frame and swingable from a vertical position upwardly to a generally longitudinal position folded toward said back support portion; a front leg brace frame, including rigid, non-foldable brace legs, hingedly connected to said main frame generally intermediate the length of said main frame to extend in one position at a longitudinally downwardly inclined angle and having its front end, engageable with and disengageable from said front leg frame, and swingable upwardly and forwardly when disengaged from said front leg frame to a generally longitudinal position folded toward said front leg support portion of the main frame; a rear leg brace frame, including rigid non-foldable brace legs, hingedly connected to said main frame generally intermediate the length of said main frame to extend in one position at a downwardly inclined angle and having a rear end, engageable with and disengageable from said rear leg frame, and swingable upwardly and rearwardly when disengaged from said rear leg frame to a generally longitudinal position folded toward said back support portion of the main frame; socket means, comprising a base with upwardly open, spreadable trap fingers extending upwardly from the base and providing a narrowed socket means entrance, provided on at least one of said leg frame cross members; one of said brace frames having transversely extending cross piece means configured to be received in said entrance, to spread said trap fingers, and to be disengageably received in said socket means when swung to said angular position; and disengageable means for supporting said back rest portion on various vertically inclined positions.

4,684,171

FOLDING WHEELCHAIR

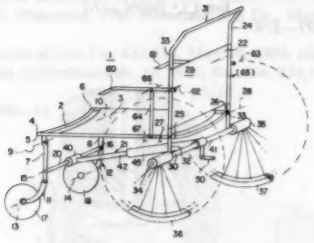
Jehan Roy, and Jean Dubois, both of Tours, France, assignors to Lacoste, SA, Saint-Pierre-Des-Corps, France

Filed May 20, 1986, Ser. No. 865,095

Claims priority, application France, Nov. 16, 1984, 8417485

Int. Cl.[4] A47C *4/00*

U.S. Cl. 297—47 **8 Claims**



1. Foldable armchair comprising:

a seat frame disposed in a first plane,

rolling means rollingly supporting the said frame, the said rolling means comprising at least two legs and means for rotatably mounting an extremity of each leg on the said frame about first and second axes of rotation respectively, said first and second axes being substantially parallel to the said first plane and coaxial, the other extremities of the two legs being connected to at least one roller by rotation means having at least two degrees of freedom of rotation, the said two legs lying substantially in a second plane substantially parallel to said first plane,

an upright rotatably mounted about a third axis parallel to said first and second axes,

a bar interconnecting said two legs, and

a telescoping lever variable in length between two limited positions, said telescoping lever being rotatably mounted at one end on the said upright and at its other end on the said bar, so as to be able to drive said legs in rotation about said first and second axes.

4,684,172

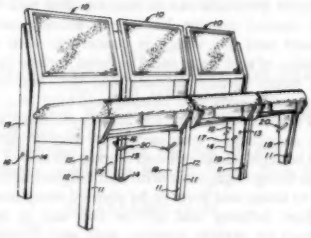
SEATING UNIT AND GANGING CONNECTOR FOR RELEASABLY INTERCONNECTING A PLURALITY OF INDIVIDUAL FURNITURE UNITS SUCH AS CHAIRS

Roy D. Lundquist, Rte. 1, Luck, Wis. 54853

Filed Jun. 12, 1986, Ser. No. 873,516

Int. Cl.[4] A47C *15/00*

U.S. Cl. 297—248 **10 Claims**



1. In combination with a pair of furniture units, each having side members with inner side surfaces and substantially planar outer side surfaces, disposed in adjacent side-by-side relationship;

at least a pair of laterally spaced apertures extending through said side members and surfaces and an coaxial alignment; and

single, rigid connecting means extending through both of said apertures, said connecting means including means for releasabiy engaging the inside of the side surface of each furniture unit opposite said adjacent outer side surfaces whereby said furniture units are maintained in triaxial rigid disposition.

4,684,173

CHAIR WITH REARWARDLY INCLINABLE SEAT AND BACK REST CARRIER

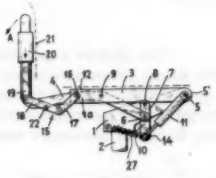
Hermann Locher, Dornach, Switzerland, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland

Filed Sep. 27, 1985, Ser. No. 780,825

Claims priority, application Switzerland, Oct. 3, 1984, 04760/84

Int. Cl.[4] A47C *3/00*

U.S. Cl. 297—300 **20 Claims**



1. A reclining chair, comprising:

seat support means including means defining a first substantially horizontal pivot axis and a second substantially horizontal pivot axis extending in mutually spaced relationship;

rearwardly inclinable seat carrier means pivotable about said first substantially horizontal pivot axis and having a rear end;

rearwardly inclinable back rest carrier means pivotable relative to said second substantially horizontal pivot axis and having a back rest region;

means coupling said rearwardly inclinable seat carrier means to said rearwardly inclinable back rest carrier means such that rearward inclinations of said rearwardly inclinable seat carrier means and of said rearwardly inclinable back rest carrier means occur conjointly and such that an ensuing downward motion of said rear end is less than an ensuing downward motion of said back rest region;

back rest means translatably guided on said rearwardly inclinable back rest carrier means; and

linkage means interconnecting said rear end of said rearwardly inclinable seat carrier means, said back rest region of said rearwardly inclinable back rest carrier means and said back rest means such that said rearward inclinations cause a downward movement of said back rest means approximately equal to said downward movement of said rear edge of said rearwardly inclinable seat carrier means.

4,684,174

QUICK RELEASE MECHANISM FOR GEAR OPERATED SEAT RECLINER

Robert L. Bell, Oxford, Mich., assignor to Fisher Dynamics Corporation, St. Clair Shores, Mich.

Continuation-in-part of Ser. No. 602,370, Apr. 20, 1984. This application Jul. 19, 1984, Ser. No. 632,597

Int. Cl.[4] B60N *1/02*

U.S. Cl. 297—367 **25 Claims**

1. A seat recliner mechanism supporting a seat back and seat bottom which permits the angle therebetween to be controllably varied comprising:

a lower recliner structure,

an upper recliner structure,

first pivot means rotatably attaching said lower recliner structure to said upper recliner structure,

a toothed rack operatively connected to one of said upper or lower recliner structures,

second pivot means carried by the other of said upper or lower recliner structures,

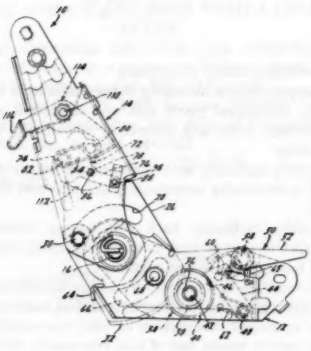
gear means mounted to said second pivot means for rotation thereabout, said toothed rack meshing with said gear means,

pawl means for engaging said gear means to control rotation of said gear means,

third pivot means connected to said other of said upper or lower recliner structures,

a recliner actuator rotatable about said third pivot means between a normal position and a released position,

quick release cam means rotatable about said third pivot means, said quick release cam means coupled to said recliner actuator,



lost motion means coupling said recliner actuator to said quick release cam means such that said quick release cam means is caused to rotate once the rotation of said recliner actuator from said normal position toward said released position exceeds a predetermined angular displacement, said quick release cam means having an engagement portion which cooperates with said pawl means such that when said recliner actuator is in said normal position, said engagement portion engages said pawl means and to maintain said pawl means in a position to engage said gear means and when said recliner actuator is moved toward said released position, said quick release cam means is rotated such that said engagement portion disengages said pawl, said quick release cam means permitting said pawl means to move from an engaged to a disengaged position quickly, and

a camplate rotatable with said recliner actuator, said camplate having a cam surface which cooperates with said pawl means to urge said pawl means into engagement with said gear means when said recliner actuator is rotated from said released position to said normal position.

4,684,175

LOCKING DEVICE FOR A REAR SEAT BACK REST

Walter P. Trutter, Wiesbaden, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

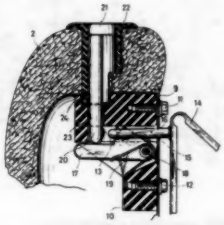
Filed Jul. 8, 1985, Ser. No. 752,519

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1984, 3425669

The portion of the term of this patent subsequent to Jan. 13, 2004, has been disclaimed.

Int. Cl.[4] B60N *1/10*

U.S. Cl. 297—379 **3 Claims**



1. A rear seat assembly for an automotive vehicle including a rear seat back rest which is pivotally supportable by body structure of the vehicle for movement between an upright position and a folded down position, and a releasable locking device carried by said seat back rest for engaging a generally horizontally disposed locking member on said vehicle body structure for automatically locking said back rest in its upright position when moved thereto, but which is manually releasable to permit said back rest to be unlocked from said locking member and be moved from its upright position toward its folded down position, the improvement being that said locking member comprises a tongue like member having a recess therethrough and that said locking device comprises

a plastic housing secured to said back panel of said seat back rest adjacent its upper end, said housing having a transverse slot therethrough defined by sides and upper and lower surfaces of said housing which receives therein said locking member when the seat back rest is in its upright position, said housing having a generally vetically extending opening in communication with said slot adjacent its end remote from said back panel and which slidably receives a pin extending through the seat back rest at its upper end which can be manually depressed, a plastic locking lever mounted to a pivot pin means supported by the sides of said housing for rotation about its axis toward and away from said upper surface defining said slot, said lever having a first portion remote from said axis of rotation of said pivot pin means for engaging said slidable pin at its lower end and a second portion defining a transversely extending locking tab at a location spaced a lesser distance from said axis of rotation than said first portion, said second portion having an arcuate surface facing toward said pin which is concentric with said axis of rotation of said lever and a beveled surface facing toward said upper surface defining said slot, and spring means engageable with said housing and said lever for biasing said lever toward said top surface defining said slot and into engagement with said lower end of said pin means, said beveled surface of said second portion of said locking lever being engageable with said tongue like locking member to cause said lever to be pivoted away from the upper surface defining said slot as said seat is being moved toward its upright position until said second portion is aligned with said recess in said locking member whereupon said spring means moves said locking lever toward said upper surface and said arcuate surface into engagement with said locking member to both lock said backrest in its upright position and to prevent rattling between the back rest and said locking member, said pin being manu-

ally depressible to move said locking lever away from said upper surface to disengage said second portion thereof from said tongue like locking member to enable said back rest to be moved from its upright position toward its folded over position.

4,684,176

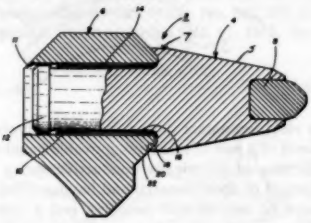
CUTTER BIT DEVICE

Leroy E. Den Besten, P.O. Box 344, Valatie, N.Y. 12184, and Cletis P. Pinkerton, 7785 Mountain Ash Dr., Mentor, Ohio 44060

Continuation of Ser. No. 610,618, May 16, 1984, abandoned. This application Feb. 24, 1986, Ser. No. 834,116

Int. Cl.[4] E21C *35/18*

U.S. Cl. 299—91 **17 Claims**



1. A cutter bit device adapted for use with a mounting block member for excavating operations, the cutter device being of an elongated construction having a conical head member and an integral shank member, said conical head member having a forward minimum diameter and a rearward maximum diameter, the axial distance between said front and rear ends defining a generally frusto-conical configuration, said rear end defined by an enlarged transverse cross-sectional dimension greater than the corresponding transverse cross-sectional dimension of a bore provided in said mounting block member and defining a peripheral skirt-like flange portion extending rearwardly toward block member, said skirt-like portion defining with said shank portion an annular, interior cam-like seat adapted to receive therein a generally correspondingly shaped cam-like follower surface formed on said block member, said cam-like seat and cam-like follower surfaces together providing a thrust-bearing connection between said block and bit members during rotation of said bit member relative to said block member, the annular cam-like surface of said skirt-like flange portion has a generally inverted frusto-conical configuration adapted for thrust-bearing rotational movement on a generally correspondingly frusto-conical surface defined by the cam-like follower surface provided on said block member, and said annular interior cam-like seat surface has a generally inverted frusto-conical configuration adapted to receive a generally correspondingly shaped configuration provided by the annular exterior cam-like follower surface on said block member.

4,684,177

AUTOMATIC CONTROL CIRCUIT FOR BRAKE CONTROL DEVICES

Jung Yong Ha, Seoul, Rep. of Korea, assignor to Kia Motors Corp., Seoul, Rep. of Korea

Filed Nov. 12, 1985, Ser. No. 797,091

Claims priority, application Rep. of Korea, Nov. 14, 1984, 84-7181

Int. Cl.[4] B60T *17/16*

U.S. Cl. 303—100 **7 Claims**

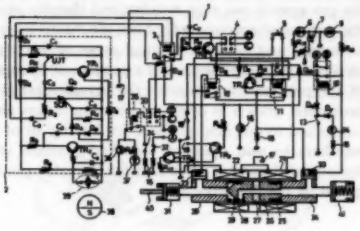
1. An automatic control circuit for a brake control device comprising:

a hydraulic brake control device for braking a vehicle in response to a hydraulic pressure therein;

a brake switch, coupled to the brake control device, for detecting a first prescribed hydraulic pressure in the brake control device and for flowing a current in response thereto;

means, responsive to the current from the brake switch, for maintaining a hydraulic pressure in an oil path in the brake control device and for maintaining a brake to the vehicle when the vehicle is stopped;

means, coupled to the brake control device, for releasing the hydraulic pressure maintained in the oil path;



means for accelerating a vehicle; and

means, coupled to the accelerating means, the pressure maintaining means, and the pressure releasing means, and responsive to the accelerating means, for releasing the hydraulic pressure maintained in the oil path upon vehicle acceleration.

4,684,178

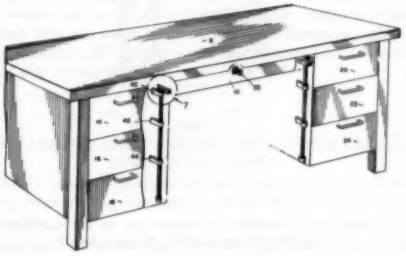
LOCKING SYSTEM

Clark E. Craig, Simpsonville, S.C., assignor to LLC Corporation, Mauldin, S.C.

Filed Aug. 22, 1985, Ser. No. 768,157

Int. Cl.[4] E05C *7/06*

U.S. Cl. 312—221 **8 Claims**



1. An improved locking system for locking a vertical array of closed drawers of a piece of furniture simultaneously upon closing an adjacent, horizontally arrayed drawer, said horizontally arrayed drawer and said vertical array of drawers separated only by means for mounting said drawers, said system comprising, in combination:

a translatable actuator pin mounted generally transverse to the direction of drawer movement in said means for mounting;

biasing means for the pin to bias the pin away from the vertical array of drawers and toward the adjacent horizontal drawer;

a pivoting member pivotally attached to the means for mounting;

pivot mounted stop members fixed to the pivoting member, in opposed relation to the vertical array of drawers, each of said stop members extending from the pivoting member generally in the direction of drawer travel as the drawers

are closed, said pivoting member having a pivot axis generally transverse to the direction of drawer travel, said pivot axis also generally transverse to the direction of translation of the actuator pin; and

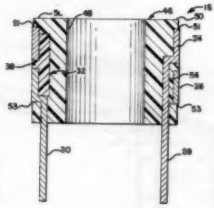
pin drive means for driving the actuator pin, said pin drive means attached to the adjacent horizontal drawer and movable with movement of the adjacent horizontal drawer between a position of engagement with the pin when the horizontal drawer is closed to thereby translate the pin against one stop member and thereby pivot all of the stop members outwardly from the means for mounting to engage and hold the vertical array of drawers in the closed or locked position, and a position of disengagement of the pin drive means with the actuator pin when the horizontal drawer is open, said biasing means also being connected to one stop member for biasing all of the stop members to said open or unlocked position when the horizontal drawer is open and the actuator pin is disengaged by the pin drive means.

4,684,179

SLIP RING ASSEMBLY FOR METHOD OF MAKING SAME

Jerry H. Freeman, 1100 W. Pendleton Pl., Mt. Prospect, Ill. 60056

Filed Jan. 22, 1986, Ser. No. 821,239
Int. Cl.[4] H01R *39/08, 43/10*
U.S. Cl. 439—27 **16 Claims**



1. A slip ring assembly for mounting on a rotatable rotor shaft of an eletrical apparatus having relatively fixed contact brush means, comprising:

an electrically non-conductive, generally annular positioning member defining first and second axially spaced outer, peripheral surfaces;

first and second electrically-conductive annular slip ring members respectively positioned on said first and second outer peripheral surfaces of said positioning member, said first and second slip ring members being positioned for contact with said brush means;

first and second electrically-conductive terminals respectively electrically joined to said first and second slip ring members, said terminals extending together in a direction axially of said slip ring members, said first terminal extending from said first slip ring member in inwardly spaced relation to said second slip ring member; and

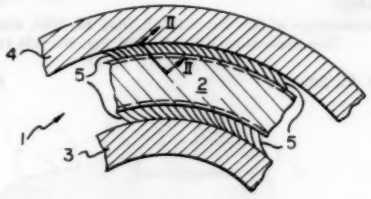
an electrically non-conductive body formed generally inwardly of said positioning member and on axially opposite ends of said slip ring members, said body defining an axial bore for receiving said rotor shaft therein for mounting said slip ring assembly on said rotor shaft.

4,684,180

SLIDING ELECTRIC CONTACTS

C. Bruce Bigham, Deep River; Robert J. Burton, Chalk River, and James E. A. McGregor, Pembroke, all of Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Feb. 5, 1986, Ser. No. 826,370
Claims priority, application Canada, Feb. 6, 1985, 473690
Int. Cl.[4] H01R *39/18, 39/32*
U.S. Cl. 439—29 **11 Claims**



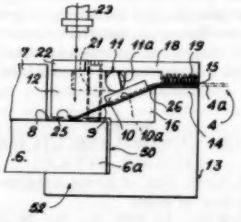
1. An electric contact device for conductively connecting the surfaces of a pair of relatively movable members, comprising a plurality of electrically conductive spring contact elements formed of sheet material and having a base portion for attachment to one of said members and a contact portion adapted to project obliquely towards a surface of the other member, the projecting axis of the contact element being normal to the direction of relative motion of the members, one of said members including a groove for receiving the base portion of said contact elements, said groove having a retaining portion of reduced width for engaging the base portion for retaining the contact elements, and wherein the depth of the groove is less than the height of the base portion of the contact element such that the maximum angle that the contact elements can project is limited to the desired oblique angle.

4,684,181

MICROCONNECTOR WITH A HIGH DENSITY OF CONTACTS

Claude Massit, Grenoble; Gérard Nicolas, Voreppe, and Gerard Turc, Echinolles, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Continuation of Ser. No. 593,871, Mar. 27, 1984, abandoned. This application Nov. 21, 1985, Ser. No. 800,362
Claims priority, application France, Mar. 28, 1983, 83 05062
Int. Cl.[4] H01R *9/09, 13/629*
U.S. Cl. 439—59 **12 Claims**



1. A microconnector for connecting N parallel electrodes to a plurality of N electrical conductors, comprising a support on which said conductors are fixedly mounted, said support being able to receive the N electrodes, a plurality of N parallel, flexible, elastic, electrically conductive wires respectively fixedly connected to the N electrical conductors and fixed to an electrically insulating part which is movable relative to the support such that when the electrodes are installed in said support, the wires and the electrodes are not in contact when

the insulating part is in a first position, and the wires and electrodes are in contact when the insulating part is in a second position, and means for moving the insulating part from the first position to the second position without displacing said support relative to said electrodes, so as to bring about simultaneous contact between the N electrodes and the respective N wires, said moving means being mounted on and movable relative to said support.

4,684,182

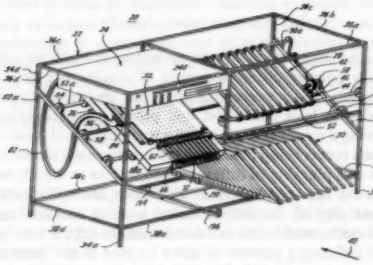
BURN-IN BOARD FOR USE WITH AUTOMATED UNLOADER

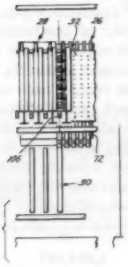
Robert L. Gussman, Houston, Tex., assignor to Reliability Incorporated, Houston, Tex.

Division of Ser. No. 709,363, Mar. 8, 1985, Pat. No. 4,584,764, which is a continuation-in-part of Ser. No. 545,747, Oct. 26, 1983, abandoned. This application Oct. 17, 1985, Ser. No. 788,860

Int. Cl.[4] H05K *1/00*

U.S. Cl. 439—68 **3 Claims**





1. A burn-in board, comprising:

a printed circuit board;

a plurality of sockets mounted on said printed circuit board; and

a plurality of passageways, at least one said passageway for each said socket, each of said passageways extending through said printed circuit board and a respective one at said sockets whereby IC packages are displaced from said sockets by insertion of tools through said passageways.

4,684,183

CONNECTOR FOR FLEXIBLE PRINTED CIRCUIT

Toshio Kinoshita, Hino, and Naoki Hiyama, Tokyo, both of Japan, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 20, 1986, Ser. No. 864,857

Claims priority, application Japan, Sep. 6, 1985, 60-197134

Int. Cl.[4] H01R *9/07*

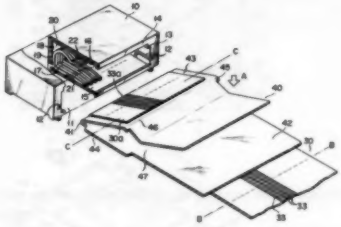
U.S. Cl. 439—77 **13 Claims**

1. An electrical connector for a flexible printed circuit comprising:

an insulating housing having an opening in an endwall, a first wall extending from a first side of the endwall and a second wall extending from an opposite second side of the endwall, said first and second walls facing each other,

a plurality of resilient female contacts arranged parallel to one another in the housing and accessible through the opening in the endwall, each female contact having a fixed base section and a free contact section, said fixed base section extending rearward from the endwall and being secured to said first wall of the housing, said free contact section extending adjacent the second wall toward the opening in the endwall, said free contact section having at its end an upwardly inclined contact area, and

a flexible printed circuit assembly comprising a V-shaped spring member formed of a thin sheet of material bent



along a line to provide a first section and an upwardly inclined second section, a flexible printed circuit comprising a plurality of insulated conductors secured to an outside surface of said spring member, the conductors of said printed circuit being exposed at an area along said upwardly inclined second section, whereby the flexible printed circuit assembly can be inserted into the housing through the opening with the V-shaped spring member being resiliently engaged between the fixed base and free contact sections of the female contacts and whereby the upwardly inclined contact area at the end of the free contact section of each female contact makes a reliable and firm electrical contact with corresponding exposed conductors along said upwardly inclined second section of said spring member.

4,684,184

CHIP CARRIER AND CARRIER SOCKET FOR CLOSELY SPACED CONTACTS

Dimitry G. Grabbe, Middletown, and Iosif Korsunsky, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 14, 1986, Ser. No. 818,831

Int. Cl.[4] H01R *23/72*

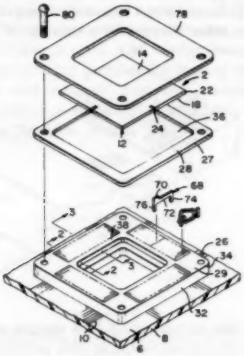
U.S. Cl. 439—64 **14 Claims**

1. A chip carrier socket and an integrated circuit chip carrier, the chip carrier comprising a rectangular chip carrier body having oppositely facing major surfaces and four laterally facing peripheral carrier body side surfaces which extend normally of the carrier body major surfaces, a plurality of chip carrier contact zones on the chip carrier socket comprising a socket body having oppositely facing first and second major surfaces and laterally facing socket body side surfaces, a rectangular chip carrier receiving recess extending into the first major surface for reception of the chip carrier body, the recess having four recess side surfaces which extend inwardly from the first major surface, passages located in the socket body in surrounding relationship to the recess, contact terminals located in a plurality of the recesses, the contact terminals being engageable with the chip carrier contact zones upon placement of the chip carrier in the recess, the chip carrier socket and the chip carrier being characterized in that:

each side of the peripheral side surfaces and each of the recess side surfaces has locating means for precisely locating the chip carrier in the recess,

each locating means comprising a key slot extending into the peripheral side surface of the chip carrier body and a key means in the chip carrier socket, the key means and the key slots being located midway between the corners of the chip carrier receiving recess and the chip carrier body respectively,

each key means being positioned in a said respective passage, of the socket body, thereby allowing the locating means to be used in sockets having a wide range of terminal centerline spacing requirements, including very close centerline spacing, and



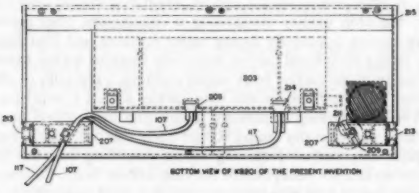
said key means and key slot being configured to interengage so that when the chip carrier undergoes thermal expansion relative to the socket, they provide four positions at which the chip carrier remains precisely and fixedly positioned in the socket so that each of said chip carrier side surfaces undergoes such thermal expansion substantially symmetrically about the key extending thereinto, thereby maintaining the terminals of the socket in electrical engagement with the contact areas of the chip carrier.

4,684,185

APPARATUS FOR ATTACHING CABLE TO A KEYBOARD

Michel D. Arney, Lowell, and Clifford E. LaCount, Townsend, both of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Nov. 1, 1985, Ser. No. 794,208
Int. Cl.[4] H01R *11/00*
U.S. Cl. 439—502 **14 Claims**



1. Cable attachment means for attaching a cable to an apparatus comprising:

first cable retention means by which one end of the cable is attached to the apparatus and

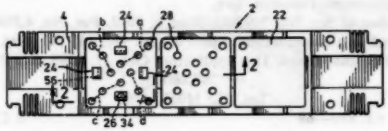
second cable retention means for attaching an intermediate point in the cable to the apparatus, the second cable retention means including a channel in the apparatus for accepting the cable and movable means movable without use of tools for retaining the cable in the channel.

4,684,186

ELECTRICAL OUTLET ASSEMBLY

Michael W. Hetherington, R.R. No. 1, Cedar Valley, Ontario, Canada L0G 1E0

Filed Jul. 23, 1986, Ser. No. 888,401
Int. Cl.[4] H01R *29/00*
U.S. Cl. 439—171 **9 Claims**



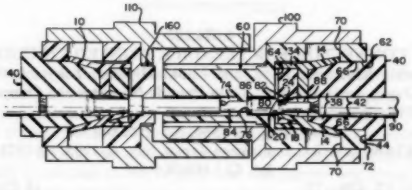
1. An outlet assembly, for providing at least one outlet selectively tapping different groups of conductors present in the assembly and representing different electrical supplies, comprising at least one outlet unit providing a receptacle for receiving a removable plug, and a body having at least one recess , each recess being configured to receive each outlet unit in any one of a plurality of different orientations to which each outlet unit can be rotated about a central axis, the body incorporating a plurality of conductive buses, passing beneath each recess and connected to the conductors of the supplies to be tapped, and defining a pattern of holes located in the bottom of each recess relative to the plurality of buses to enable the latter to be tapped by conductive pins inserted in the holes, each outlet unit having a number of conductive pins on its rear surface at least equal to the number of conductors in a supply to be tapped and connected to outlet sockets in the outlet unit, the pins and holes being arranged so that for different orientations in which each recess can receive each outlet unit, the pins of the latter will tap different groups of conductors representing different supplies, each outlet unit and the body further comprising cooperating means to indicate which supply has been tapped, and cooperating securing means to prevent withdrawal of each outlet unit from the body during removal of a removable plug from that outlet unit.

4,684,187

RETENTION ARTICLE FOR ELECTRICAL CONTACTS

William J. Rudy, Jr., Annville, and Thomas H. Wycheck, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 626,002, Jun. 29, 1984, abandoned. This application May 28, 1986, Ser. No. 869,468
Int. Cl.[4] H01R *11/00*
U.S. Cl. 439—600 **42 Claims**



1. An article for retaining electrical terminals within a hous-

ing of an electrical connector comprising a stiff wafer-like article of dielectric material with first and second portions of elastomeric material secured thereto;

said article having a plurality of holes extending therethrough for insertion of terminals thereinto to be retainingly secured thereby and said article being securable within a cavity of said housing;

said wafer-like article having a planar section axially normal to said holes, and opposing frustoconical wall sections associated with and extending partially around each said hole;

said wall sections extending forwardly from said planar section and partly converging, and having stop surfaces on ends thereof for engaging a rearwardly-facing stop surface of a stop shoulder of a terminal inserted thereinto;

said first portion of said elastomeric material extending forward from said planar section and surrounding and abutting outside surfaces of said wall sections around said holes to increase the resistance to radial expansion of said wall sections and urge them radially inward against a said terminal inserted thereinto; and

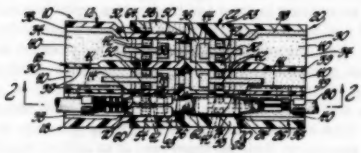
said second portion of elastomeric material extending rearwardly from said planar section with said holes extending therethrough to a rearward end of said retention article whereinto said terminals are insertable, said terminals having been terminated to electrical conductors and a portion of each said conductor being secured in said holes in said second portion.

4,684,188

ELECTRICAL CONNECTOR ASSEMBLY

Nancy M. Klembus, Newton Falls, and Gary C. Detter, Berlin Center, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 3, 1986, Ser. No. 825,270
Int. Cl.[4] H01R *11/00*
U.S. Cl. 439—587 **4 Claims**



1. An electrical connector assembly having an insulator housing which includes a terminal holder and a housing cover for the terminal holder, comprising:

said terminal holder having a longitudinal platform for supporting elongated electrical terminals which has a forward portion and a rearward portion,

said forward portion of the platform having a plurality of longitudinal fingers and said rearward portion of the platform having a plurality of partition walls which define terminal receiving channels which are associated with respective ones of the fingers and which are shaped so that the elongated electrical terminals are laterally insertable into the terminal receiving channels,

each of said fingers having a pair of spaced, deflectable latch arms for retaining a terminal which is laterally inserted into an associated terminal receiving channel, and

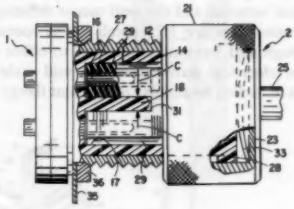
said housing cover having a forward portion which has means to hold the latch arms in terminal retaining positions, said means including a plurality of guide walls of the housing cover which fit between adjacent fingers of the terminal holder when the terminal holder is disposed in the housing cover.

4,684,189

HIGH VOLTAGE PLUG AND RECEPTACLE

John D. Swaffield, Woburn, Mass., assignor to Alden Research Foundation, Brockton, Mass.

Filed Aug. 22, 1985, Ser. No. 768,140
Int. Cl.[4] H01R *11/00*
U.S. Cl. 439—587 **4 Claims**



1. A two-part multiconductor high voltage electrical coupling comprising:

a first coupling part having two parallel, spaced conductor terminals,

an insulative body supporting the terminals and forming a socket around the terminals, and

an insulative barrier wall extending from the body between the terminals; and

a second coupling part having two spaced conductors mating with the terminals of the first part,

an elastic, insulating support body for the conductors forming sleeves around the mating conductors respectively and a slot between the sleeves;

the socket of the first coupling part being shaped to receive the support body of the second part with the barrier wall snugly fitted in the slot, and said support body and socket having opposed mating surfaces continuously diminishing in cross section into the socket so as to compress the elastic body laterally against the barrier wall thereby continuously to squeeze closed any air path along the barrier wall between spaced conductors,

the coupling including spring means pressing endwise against the support body to maintain the squeeze of the elastic sleeve on the barrier wall.

4,684,190

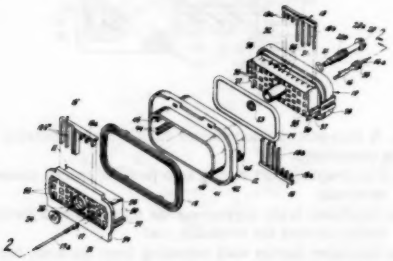
SEALED ELECTRICAL CONNECTOR WITH SHROUD

Roger A. Clark, Warren; Paul D. Doherty, Cleveland Heights, and Emil J. Tolnar, Jr., Cortland, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 5, 1986, Ser. No. 836,498
Int. Cl.[4] H01R *11/00*
U.S. Cl. 439—587 **2 Claims**

1. An electrical connector with sliding shroud assembly adapted for mounting onto an apertured bulkhead including a shroud having a hollow, tubular shell means with orientation guide means on the inner peripheral surface thereof and an outer annular flange extending radially outward from its outer peripheral surface intermediate the ends thereof, said tubular shell having one end thereof adapted to be inserted through an aperture in the bulkhead; a gasket means fixed to said flange on the side thereof adjacent to said one end of said tubular body; a female connector body means having a portion thereof with guide means thereon whereby said portion is slidably received in said one end of said tubular shell as orientated by said guide means thereon; a male connector body means having a portion with guide means thereon whereby said portion is slidably received in the opposite end of said tubular shell as orientated

by said guide means thereon; each of said connector portions having a central, longitudinal, fastener receiving aperture and spaced apart, longitudinal, vertically aligned sets of terminal apertures extending therethrough, and a plurality of spaced apart transverse apertures extending through said sets of terminal apertures; electrical terminal means operatively positioned in each of said terminal apertures, each of said terminal apertures in said male connector being sized so as to receive an associate electrical terminal with an electrical cable extending therefrom outboard of said male connector, a cable seal ring sealing encircling each said electrical cable next adjacent to said electrical terminal and the wall means defining an associate said terminal aperture; lock comb means operatively positioned through said transverse apertures to effect axial retention of said electrical terminal means; said male connector body means including an annular return bent flange upstanding



from the outboard end of its associate said connector portion to receive the associate end of said tubular body of said shroud; a ring seal located in said return bent flange in position to effect sealing engagement between said shroud and said male connector body means; said female connector body means including an annular flange upstanding from the outboard end of its associate connector portion which is adapted to be operatively associated with a bulkhead to sealingly sandwich said gasket means between said annular flange of said shroud and the bulkhead when the sealed shroud and electrical connector body means assembly is installed on the bulkhead; and, a fastener means including a bolt and a captive nut operatively positioned in said fastener receiving apertures in said male and female connector body means for the axial retention of said female body means relative to said male connector body means and operative to bring said gasket means into sealing engagement with said bulkhead.

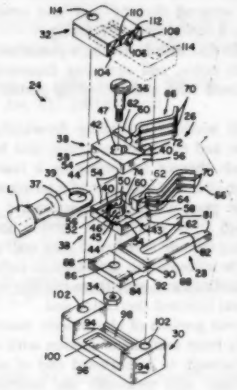
4,684,191

ELECTRICAL TERMINAL AND ELECTRICAL CONNECTOR ASSEMBLY

Michael S. Feber, Steelton; Charles H. Weidler, Lancaster, and James H. Wise, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 30, 1986, Ser. No. 880,231
Int. Cl.[4] H01R *13/64, 13/20*
U.S. Cl. 439—246 **15 Claims**

1. A bipartite electrical terminal for making electrical connection to an electrical contact element having a hole therethrough, the terminal comprising a pair of metal plates each provided with a through aperture opening into opposite faces of said plate and with a shaft segment comprising a first portion outstanding from one of said opposite faces of said plate and having a free end remote therefrom and a second portion forming a segment of the periphery of the aperture in said plate, the first portion of each shaft segment being capable of being force fitted into the aperture of the other plate, with said first portions of said segments extending through the hole in said contact element, whereby said segments cooperate to provide a hollow shaft for receiving a fastener therethrough



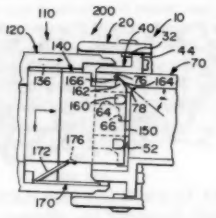
and the plates are retained in superposed relationship about said contact element.

4,684,192

BREAKAWAY ELECTRICAL CONNECTOR

William B. Long, Camp Hill; Gary L. Over, Harrisburg; Howard R. Shaffer, Millersburg, and John R. Shuey, Mechanicsburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 18, 1986, Ser. No. 908,753
Int. Cl.[4] H01R *13/20*
U.S. Cl. 439—374 **25 Claims**



1. An electrical connector assembly of a first connector and a second connector and instantaneously unmatable under limited axial unmating force, comprising:

first dielectric insert means having a receptacle section forwardly thereof and including a plurality of terminal-receiving passageways extending rearwardly from a first mating face, said passageways each having secured therein a first terminal terminated to a respective conductor, each said first terminal having a first contact section proximate said first mating face;

first shell means associated with said first insert means and including first means for mounting said first insert means therein adapted to permit limited axially rearward movement of said first insert means against first spring means;

second dielectric insert means having a plug section forwardly thereof and including a plurality of terminal-receiving passageways extending rearwardly from a second mating face, said passageways each having secured therein a second terminal terminated to a respective con-

ductor, each said second terminal having a second contact section proximate said second mating face;

second shell means associated with said second insert means and including second means for mounting said second insert means therein adapted to permit limited movement of said second insert means against second spring means in a selected axially normal direction;

a forward section of said first shell means being adapted as a hood to receive thereinto a forward section of said second shell means, said first and second shell means having cooperating means for polarized mating;

said receptacle section of said first insert means being adapted to receive thereinto said plug section of said second insert means, said second contact sections being disposed within respective said passageways of said second insert means;

said first contact sections extending forwardly from said first mating face within said receptacle section of said first insert means and aligned with said passageways of said second insert means during mating to be received thereinto, and said first contact sections being adapted to be urgeable in said selected axially normal direction away from a selected receptacle side by said second contact sectios of said second insert means;

said first shell means having camming means secured thereto and associated with said selected side of said receptacle section of said first insert means, said camming means engageable by said second insert means upon polarized entry thereof into said receptacle section under axial force during mating to urge said second insert means in said selected axially normal direction against said second spring means to a tentative mating relationship with said first insert means and establishing assured contact normal force between said first and said second contact sections at least upon full mating;

a forward end of said plug section of said second insert means including latching means extending toward said camming means and latchable with a cooperating latching means of said camming means upon said second insert means engaging and urging rearwardly said first insert means after achieving said tentative mating relationship, said second insert means held in a latched position by said second spring means and thereby being latched in a fully mated relationship with said first insert means; and

said latching means and said cooperating latching means being adapted such that said second insert means is delatchable from said first insert means and said first shell means upon application of a selected minimum axial tensile force applied to at least said first shell means and said second insert means to overcome the spring force applied by said second spring means and the resistance to delatching applied by said cooperating latching means, whereby said first and said second connectors are unmatable solely by said application of said selected minimum axial tensile force.

4,684,193

ELECTRICAL ZERO INSERTION FORCE MULTICONNECTOR

Karel 38Havel, P.O. Box 66, Station M, Toronto, Ontario, Canada M6S 4T2

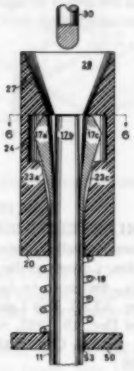
Filed Aug. 8, 1986, Ser. No. 894,667
Int. Cl.[4] H01R *13/62*
U.S. Cl. 439—259 **9 Claims**

1. An electrical multiconnector comprising:

an insulating base;

a plurality of conducting connector elements disposed in said base and extending therefrom in generally parallel relation, said connector elements being arranged to correspond to the arrangement of a plurality of conducting pins on a connector assembly to be mated with, each said connector element including a slider member arranged thereon for longitudinal movement therealong to its engaging position and away from its engaging position;

an actuator plate adapted for reciprocal movement in a direction generally parallel to the direction of elongation of said connector elements between a disengagement and engagement positions;



said actuator plate being operative in its disengagement position to allow said slider members to move away from their engaging positions such that said connector elements do not engage said pins; and

said actuator plate being operative in its engagement position to urge said slider members to their engaging positions such that said connector elements are in electrical contact engagement with respective said pins.

4,684,194

ZERO INSERTION FORCE CONNECTOR

John W. Jenkins, Mt. Prospect, and William F. Laubach, Elk Grove Village, both of Ill., assignors to TRW Inc., Redondo Beach, Calif.

Continuation of Ser. No. 631,033, Jul. 16, 1984, abandoned. This application Feb. 25, 1986, Ser. No. 833,662
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—260 **1 Claim**

1. A zero insertion force electrical connector comprising an upper insulator housing portion having outer walls and an underlying insulator base portion; a plurality of cantilever contacts mounted on said base portion and having flexible portions with bend portions formed therein extending into said upper housing portion; said upper insulator portion having spaced inner slotted walls defining a central connector opening for reception of a connector board; barrier walls for receiving said contact flexible portions therebetween and extending from the inner walls in the direction of said outer walls; said barrier walls having spaced edges terminating short of an adjacent outer wall inner surface; and cam means reciprocally movable between said outer walls and the spaced barrier wall edges and

movable into engagement with said contact bend portions for engaging said contact bend portions and camming the flexible contact portions into said central connector opening; spaced reinforcing ribs interconnecting upper, oppositely disposed inner surface portions of each of said outer walls and an adjacent slotted inner wall; said ribs being molded integrally with said outer and inner walls; said cam means having slotted upper edge portions for reception of said ribs therein at the end limit of said cam means movement into said upper insulator housing portion.

4,684,195

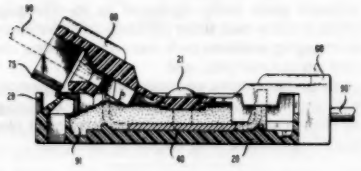
SOLDERLESS ELECTRICAL CONNECTOR

Jerry M. Anderson, Austell; Thomas C. Cannon, Jr., Dunwoody; Bruce V. Darden, Lawrenceville, and Donald T. Smith, Norcross, all of Ga., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 19, 1985, Ser. No. 810,980

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—404 **6 Claims**



1. A connector for electrically joining one or more wires to one or more other wires, the connector comprising a base, at least one electrically conductive contact member, and a cover comprising a central section, two end sections, and two hinge sections flexibly joining the central section to the respective end sections, wherein

(a) the base comprises contact member receiving means and means for attaching the cover to the base;

(b) the contact member is positioned in the contact member receiving means, the contact member is a substantially U-shaped member consisting of a central portion, two end portions, and a transition portion between the central portion and each respective end portion, the contact member comprising two pairs of opposing posts, with a slot between the opposing posts, each pair of posts adapted for receiving therebetween a wire such that electrical contact between the contact member and the wire is established, each pair of opposing posts extending the length of the respective end portion and transition portion and also extending into the central portion;

(c) the cover is attached to the base, each cover end section comprising

(i) wire receiving means forming a wire receiving passage comprising a void adapted for receiving therein the respective end portion of the contact member,

(ii) means for engaging the base after the base and the end section of the cover are pressingly closed from an open position to a closed position, thereby intersecting the wire-receiving passage with the respective end portion of the contact member; and

(iii) means, operative on closing, for placing a wire present in the wire-receiving passage into the slot between the respective opposing posts of the contact member.

4,684,196

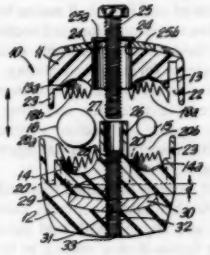
ELECTRICAL CLAMP CONNECTOR

Philip L. Smith, and Joseph R. Caprio, both of Madison, Conn., assignors to Kupler Corporation, Branford, Conn.

Filed Apr. 25, 1986, Ser. No. 856,455

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—411 **7 Claims**



1. An electrical clamp connector, comprising: first and second half portions molded of electrically insulating material and means to connect said half portions together; each half portion having at least two lengthwise grooves therein, the grooves mating and serving to enclose electrical conductors upon connecting of the two half portions together; at least two electrical bridging members in the first half portion extending transverse to the respective grooves therein and positioned opposite correspondingly positioned electrical bridging members in the second half portion; each bridging member having a first set and second set of piercing teeth respectively protruding from two grooves of its half portion; the means to connect the half portions together comprising an oblong bolt opening in the first half portion, a threaded bolt for passing through the bolt opening, a generally tubular pipe of insulating material integral with and upstanding from the second half portion and positioned between the grooves and the bridging members of the second half portion, said tubular pipe of insulating material having a central opening through its length and internal threads through at least a portion of its length, a metal plate with a threaded central passage therethrough and encapsulated within the second half portion at a substantial distance above the bottom surface of the second half portion, a first cylindrical threaded passage extending in said second half portion between said tubular pipe and said metal plate, and a second cylindrical passage extending in said second half portion between said metal plate and the bottom surface of the second half portion; the threaded central opening of the tubular pipe, the first cylindrical threaded passage, the threaded passage through the metal plate, and the second cylindrical passage all being precisely axially aligned; the threads of the tubular pipe, first cylindrical passage and metal plate passage forming one continuous thread for interacting with the threaded bolt; and, the bolt terminating within the body of the second half portion when the first and second half portions are bolted together about conductors.

4,684,197

PLUG-IN CONNECTOR AND CONTACT ELEMENT FOR SAME

Manfred Reichardt, Weinsberg, and Gunter Schutzle, Heilbronn, both of Fed. Rep. of Germany, assignors to Allied Corporation, Morris Township, N.J.

Filed Aug. 27, 1984, Ser. No. 644,468

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1983, 3332319; Jun. 22, 1984, 3423176

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—404 **14 Claims**

1. A plug-in connector comprising:

an insulating element having a plurality of apertures for receiving a plurality of contact elements in a plurality of

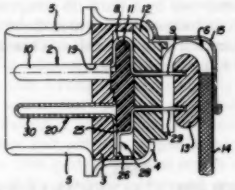
rows arranged substantially parallel to the longitudinal axis of said connector;

each of said contact elements comprising a terminal part, a connecting part and a middle part connecting said terminal part to said connecting part, said terminal part being in the form of a knife terminal for receiving a conductor wire of a flat cable,

the spacing between terminal parts of adjacent contacts in each row of contacts being different from the spacing between connecting parts of adjacent contacts in each row of contacts,

said terminal parts of said contacts in each row of contacts being arranged in a line parallel to said longitudinal axis, and said connecting parts of said contacts in each row of contacts being arranged in a line parallel to said longitudinal axis,

said middle part of each of said contacts comprising two legs which overlap one another and being of a substantially U-shaped form, said two legs forming a bulge extending towards the longitudinal sides of said connector,



each of said contact elements being initially formed in substantially the same configuration and being bent in said insulating element such that the two legs of said middle part of said contact elements arranged substantially in the center of said connector along said longitudinal axis are in substantial alignment whereby said terminal part and said connecting part of said centrally arranged elements are located substantially one above the other, and the two legs of said middle parts of said contact elements located the farthest from said center of said connector are angularly offset a maximum amount with respect to the two legs of said other contact elements whereby said terminal part and said connecting part of said farthest located contact elements are offset from each other the maximum amount as compared to other contact elements in the same row, and

an insulating plate provided in said connector, said plate having side edges, said bulges of said middle parts of said contact elements extending over said side edges.

4,684,198

MODULAR CABLE INTERCONNECTION APPARATUS

Arthur D. Becraft, Colts Neck; Howard M. Citron, Oceanport, and Joseph E. Tatarski, Point Pleasant, all of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

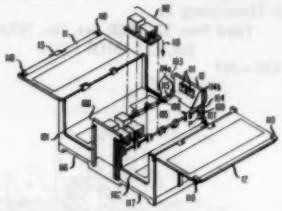
Continuation of Ser. No. 636,721, Aug. 1, 1984, abandoned. This application Jun. 4, 1986, Ser. No. 871,180

Int. Cl.[4] H02B *1/02*

U.S. Cl. 439—571 **14 Claims**

13. A rectangularly shaped interconnection unit comprising means for terminating a cable at a first and a second end of a top side of said unit using any one of a variety of cable terminating means,

means located at said first and second ends below said cable termination means on a bottom side of said unit for mounting said unit in a snap mounting arrangement using the corners formed by the bottom sides and said first and second ends of said unit such that when the unit is mounted the cable termination means of said unit are



located above a plane formed by the snap mounting arrangement.

4,684,199

CONNECTOR PLUG

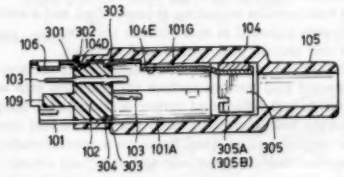
Tadayoshi Ezure, Isesaki, and Shigemi Sekiguchi, Kiryu, both of Japan, assignors to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed Feb. 5, 1986, Ser. No. 826,464

Claims priority, application Japan, May 13, 1985, 60-70221

Int. Cl.[4] H01R *13/506*

U.S. Cl. 439—610 **15 Claims**



1. A connector plug comprising:

an insulating body;

a plurality of contact pins carried by said insulating body, each of said contact pins having a contact portion and a terminal portion extending respectively from front and rear ends of said insulating body;

a cylindrical metal cover compdrising a rolled resilient metal sheet the opposite edges of which are disposed closely adjacent to each other, said cylindrical metal cover having a semi-cylindrical rear portion defining a side opening extending rearwardly to merge into a rear opening of said cylindrical metal cover, said insulating body being disposed in said cylindrical metal cover with said contact pins extending through said insulating body inside said cylindrical metal cover in an axial direction thereof;

a semi-cylindrical metal cover piece detachably mounted on said cylindrical metal cover to close said side opening and cooperating with said semi-cylindrical rear portion of said cylindrical metal cover to form a cylinder;

a cable having a plurality of wires and an insulating sheath covering said wires, said wires being connected to respective ones of said terminal portions of said contact pins inside said semi-cylindrical metal cover piece and said semi-cylindrical rear portion of said cylindrical metal cover;

a cable clamp means coupled to the rear end of said semi-cylindrical rear portion for clamping said cable; and

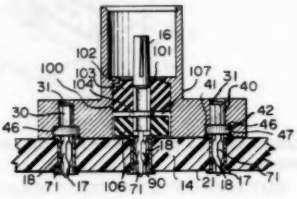
a separately molded insulating cap formed of a resin material, said insulating cap being positioned to cover said cylindrical metal cover, said semi-cylindrical metal cover piece, said cable clamp means and a portion of said cable clamped by said cable clamp means while exposing a front end portion of said cylindrical metal cover.

4,684,200

PRESS FIT CABLE TERMINATION FOR PRINTED CIRCUIT BOARDS

Randolph E. Capp, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 12, 1985, Ser. No. 797,053
Int. Cl.[4] H01R *17/18*
U.S. Cl. 439—387 **19 Claims**



1. An electrical connector for coaxial cable and for attachment to a circuit board, comprising,

a sleeve portion and a base portion,

said sleeve portion including first and second means for coupling to a signal and a ground conductor, respectively, of a coaxial cable,

said first and second means being spaced apart and electrically insulated from one another, said base portion constructed with a bottom surface for abutting against said circuit board along a top surface thereof,

said base portion including at least a first and a second recess therein exposed at said bottom surface,

first and second pins within said recesses,

each said pin including a bifurcated center section extending beyond said bottom surface for insertion into said circuit board, said bifurcated center section being adapted to fit snugly within an associated aperture in said circuit board in response to an axial force on a corresponding said pin applied thereto upon insertion into said circuit board,

each said pin is widened at a corresponding said bifurcated section for press fit within said associated aperture,

each said pin having a hexagonal head portion for permitting orientation of said pin in said associated recess,

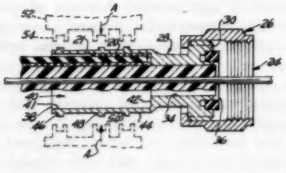
each said pin having a circular shoulder portion, each said shoulder portion having a periphery with axially aligned striations therein, each said associated recess having a stepped structure for providing a bearing surface for a corresponding said shoulder portion and a snug fit at said periphery adapted to conform to said striations to resist rotation of the corresponding pin.

4,684,201

ONE-PIECE CRIMP-TYPE CONNECTOR AND METHOD FOR TERMINATING A COAXIAL CABLE

Harold G. Hutter, Brookfield, Conn., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jun. 28, 1985, Ser. No. 750,372
Int. Cl.[4] H01R *17/18*
U.S. Cl. 439—585 **2 Claims**



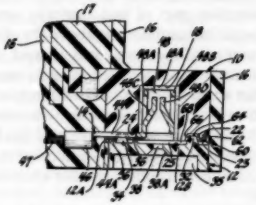
1. A one-piece crimp-type connector terminated to a coaxial cable, said cable including a center conductor successively circumposed by a dielectric layer, an outer braid conductor, and an outer insulating jacket, and said connector comprising a conductive sleeve having an exterior end face, an interior end wall, an inner wall defining a bore for receiving an end portion of said cable, said bore extending between the end face and the end wall, and securing means engaging the end portion of said cable for securing the cable within said bore, characterized by a portion of the outer braid conductor being exposed and folded rearwardly an amount sufficient to surround part of the insulating jacket disposed in the bore with the braid fold forming a conductive bight for abutting the end wall, said sleeve being a one-piece member and the securing means comprising three continuous annular ribs arranged around the outer periphery of said sleeve each rib being crimped radially inward so that the inner wall circumposed by a first rib compressively engages the insulating jacket adjacent to the end face to grip said cable and to provide a moisture seal around the entrance of said cable to said bore, the inner wall circumposed by a second rib compressively engages the braid conductor against the insulating jacket to provide an electrical path between said braid conductor and said sleeve and to grip said cable, and the inner wall circumposed by a third rib compressively engages the outer braid conductor adjacent to said end wall to provide an additional electrical path between said braid conductor and said sleeve and to grip said cable.

4,684,202

OVERMOLDED ELECTRICAL CONNECTOR

Ronnalee House, and Roger W. Kellams, both of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 25, 1986, Ser. No. 899,877
Int. Cl.[4] H01R *13/504, 13/514*
U.S. Cl. 439—752 **4 Claims**



1. An electrical connector assembly that is adapted to be overmolded with a plastic covering material comprising, a terminal block formed of electrical insulating material having at least one cavity, a groove formed in one face of said terminal block disposed about said cavity, a cover member secured to said terminal block having a tongue portion located within said groove, an electrical terminal having at least one flexible spring finger portion disposed within said cavity and having a tab portion that extends from said cavity to a point exterior of said terminal block and cover, said tab portion extending through a slot formed in said terminal block, said cover member having at least one crushable rib that is engageable with one side of said tab portion, the opposite side of said tab portion being engageable with a surface on said terminal block, said assembly being adapted to be placed in molding apparatus that during the molding operation forces the cover member and terminal block together, said tab portion being clamped between said crushable rib and said surface to prevent molding operation and said tongue and groove operating to prevent molding material from entering said cavity during a molding operation.

4,684,203

SMALL-SIZED CONTACT PIN PACKAGE

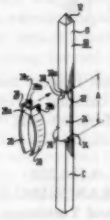
Otto Bihler, Schleiferweg 2, D-8959 Halblech, Fed. Rep. of Germany

Continuation of Ser. No. 513,026, Jul. 12, 1983, abandoned. This application Jan. 31, 1986, Ser. No. 825,688

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1982, 3228581; European Pat. Off., Jan. 28, 1983, 83100831.3

Int. Cl.[4] H01R *13/42, 9/09*

U.S. Cl. 439—751 **116 Claims**



1. A small-sized electrical contact pin unit for engagement with an internal surface (**18**) of a plug socket (**14**) capable of being provided in a device such as a printed circuit board, said internal surface (**18**) having an approximately circular cross-sectional area, said contact pin unit comprising an elongate basic pin (**10**) having a longitudinal axis and longitudinally arranged opposite end portions, a partial section (A) being elongate over at least part of the axial length of the basic pin (**10**) between said longitudinally arranged opposite end portions, said partial section (A) having lateral faces (**24, 26**), said partial section (A) having a long cross-sectional axis (X), whose length corresponds approximately to the inside diameter of said internal surface (**18**) so as to provide centering of the basic pin (**10**) in the plug socket **14**, and a short cross-sectional axis (Y), at least one (**24**) of said lateral faces (**24, 26**) being substantially perpendicular to the short cross-sectional axis (Y) within said partial section of said basic pin (**10**), a contact spring (**20**) elongate in said axial direction, said contact spring being laterally supported on said one lateral face (**24**) in a direction perpendicular to the longitudinal axis of the basic pin (**10**) without extending over either of the longitudinally extending opposite end portions of said basic pin and being conductively connected to said basic pin, said contact spring (**20**) being dimensioned such as to make electric contact with said internal surface (**18**) of said plug socket (**14**) with radial pressure substantially perpendicular with respect to said one lateral face (**24**), said contact spring (**2**) being formed of sheet metal and, considered in a cross-section that is perpendicular to the longitudinal axis of the basic pin (**10**), said contact spring (**20**) being curved and having a substantially concave internal side (**20***a*), which is directed towards the basic pin (**10**), and a substantially convex external side (**20***b*) which is directed towards the internal surface (**18**) of the plug socket (**14**) when the contact pin unit is mounted in the socket.

4,684,204

ELECTRON SOURCE ASSEMBLY WITH A REPLACEABLE FILAMENT RIBBON

Bruce S. Johnson, San Mateo, and Dennis M. Taylor, Santa Clara, both of Calif., assignors to Finnigan Corporation, San Jose, Calif.

Filed Feb. 18, 1986, Ser. No. 830,671

Int. Cl.[4] H01J *1/18*

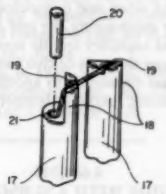
U.S. Cl. 439—863 **3 Claims**

1. A filament assembly including:

a header,

at least a pair of spaced posts extending through said header, means at the end of each of said post for receiving and positioning a filament so that it extends between the ends of said spaced posts,

said posts including tapered holes for receiving the ends of a filament extending past the ends of said posts, and



means adapted to be inserted into said tapered holes for releasably securing the ends of the filament to said posts at said holes, said securing means serving to tension the filament as they are inserted into the tapered holes whereby the posts are urged toward one another to maintain the filament in tension.

4,684,205

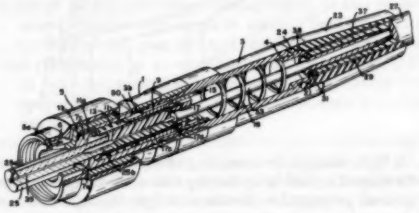
FIBER OPTIC CONNECTOR WITH COMPENSATING MECHANISM

Mark Margolin, Lincolnwood; James E. Moore, Wheaton, and Igor Grois, Lincolnwood, all of Ill., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jul. 19, 1985, Ser. No. 757,097

Int. Cl.[4] G02B *6/38*

U.S. Cl. 350—96.21 **17 Claims**



1. A fiber optic cable connector, comprising:

a body having two ends;

cable connection means for connecting a fiber optic cable of the type having a fiber extending through the center thereof with the fiber concentrically surrounded by a buffer layer to said body at one end thereof in a manner such that a portion of the cable having the fiber surrounded by the buffer layer and a portion of the cable having the fiber stripped of its buffer layer extends into said body;

fiber retention means for holding the buffer layer covered fiber at a terminated portion of the buffer layer wherefrom the fiber extends, and for holding the bare fiber extending from the terminated buffer layer in fixed relationship with respect to said fiber retention means, and within said body

capillary ferrule means for receiving said portion of said bare fiber therein in a manner such that said fiber is slidable within said capillary ferrule means and further including capillary retaining means for holding said capillary ferrule means in fixed relationship with respect thereto and in a manner extending frm the oher end of said body, and such that said capillary retaining means is retained within said body;

spring means for urging said capillary retaining means toward said other end of said body and for permitting said

capillary ferrule means to retract into said body upon a force being applied thereto when said connector is connected to a like connector; and

compensating means for permitting termination of said fiber in a manner such that it is urged outwardly from the end of said capillary ferrule means when said connector is assembled, and when said connector is connected to a like connector for maintaining the end of the fiber flush with the end of said capillary ferrule means, whereby physical contact between the ends of two bare fibers is obtained by connecting said connector to another like connector and maintained under varying temperature and alignment conditions.

4,684,206

LIGHT WAVEGUIDE WITH A SUBMICRON APERTURE, METHOD FOR MANUFACTURING THE WAVEGUIDE AND APPLICATION OF THE WAVEGUIDE IN AN OPTICAL MEMORY

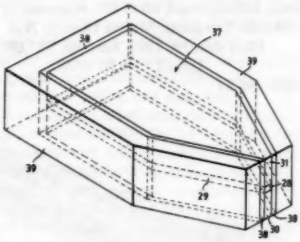
Johannes G. Bednorz, Adliswil; Winfried Denk, Zurich; Martin Lanz, and Wolfgang D. Pohl, both of Adliswil, all of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1983, Ser. No. 563,715

Claims priority, application European Pat. Off., Dec. 27, 1982, 82111975.7

Int. Cl.[4] G02B *6/10*; B29D *11/00*; B23P *15/00*

U.S. Cl. 350—96.12 **11 Claims**



1. A light waveguide consisting of an optically transparent needle-shaped crystal body having side walls extending along the general propagation direction of light through said body and first and second ends, said body covered with a reflective material, one end of said body being sharply pointed forming a tip thereat, said other end being optically flat, said reflective material having a deformation pressed therein forming an aperture in said reflective film, the diameter of said aperture being less than 500 nm.

6. A method for manufacturing a light waveguide, characterized by cutting a transparent crystal body to the desired size, preparing a conical tip at one end thereof with an angle of approximately 60 degrees, and polishing the other end optically flat, etching said tip to form a sharply pointed apex, covering said crystal body with an opaque film and mechanically deforming said opaque coating to expose a region on said apex, thereby forming an aperture having a diameter between 10 and 500 nm.

4,684,207

FIELD DEPENDENT ELECTROOPTIC DEVICE AND METHOD

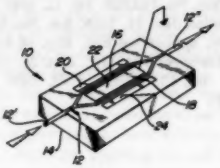
William N. Lawless, c/o CeramPhysics, Inc., 921 Eastwind Dr., Suite 110, Westerville, Ohio 43081

Filed Apr. 30, 1985, Ser. No. 729,034

Int. Cl.[4] G02B *6/10*

U.S. Cl. 350—96.14 **14 Claims**

1. In an electrooptic device operating at millimeter wavelengths which alters the refractive index of an electrooptic substrate material by application of an electric field, the improvement comprising: as the electrooptic substrate material, a ferroelectric ceramic selected from the group consisting of $(Ba_xSr_{1-x})\ TiO_3$ and $(Pb_yCd_{1-y})_2(Ta_zNb_{1-z})_2O_7$, where x is



greater than 0 and less than 1, and y and z are numbers in the range of from 0 to 1, said ceramic having a transition temperature, T_o, in the range of from 50–90K.

4,684,208

OPTICAL BRANCHING ELEMENT

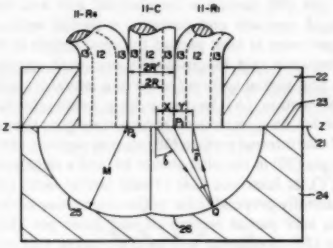
Haruo Ishikawa, Oume, and Yoshimasa Fujii, Funabashi, both of Japan, assignors to Sumitomo Metal Mining Company Limited, Tokyo, Japan

Filed Feb. 22, 1985, Ser. No. 704,174

Claims priority, application Japan, Feb. 29, 1984, 59-37965

Int. Cl.[4] G02B *6/28*

U.S. Cl. 350—96.15 **11 Claims**



1. An optical branching element which comprises

a central optical transmission line, said central optical transmission line having a circular cross section and a predetermined diameter and a straight end portion, said straight end portion including a flat end surface which is perpendicular to an imaginary center line which extends through said straight end portion, said flat end surface defining an imaginary plane,

a plurality of peripheral optical transmission lines, each peripheral optical transmission line having a circular cross section and a diameter which is about the same as said predetermined diameter of said central optical transmission line, each peripheral optical transmission line having a straight end portion which defines a flat end surface which is perpendicular to an imaginary center line which extends through the associated straight end portion, the straight end portion of each peripheral optical transmission line being positioned with respect to the straight end portion of said central optical transmission line such that they are in contact with the straight end portion of said central optical transmission line and such that the flat end surfaces thereof are positioned in said imaginary plane, the flat end surfaces of said peripheral optical transmission lines contacting the flat end surface of said central optical transmission line at respective contact points,

a holder in which the straight end portions of said central optical transmission line and said plurality of peripheral optical transmission lines extend, said holder maintaining contact between said central optical transmission line and

said peripheral optical transmission lines and maintaining the flat end surfaces thereof in said imaginary plane, said holder including a flat contacting surface which is located in said imaginary plane, and

a reflector which is in contact with the flat contacting surface of said holder and which includes means forming a concave reflecting surface therein which faces said end surfaces of the straight end portions of said central optical transmission line and said peripheral optical transmission lines, said concave reflecting surface being symmetrical about a center point which is located on said imaginary center line which extends through said straight end portion of said central optical transmission line, said concave reflecting surface being formed of a plurality of reflective surface portions, the number of reflective surface portions equalling the number of peripheral optical transmission lines, each reflective surface portion having a semi-spherical surface which is defined by a predetermined radius from a respective said contact point, said predetermined radius being larger than the diameter of the peripheral optical transmission line with which the reflective surface portion is associated.

4,684,209

DEVICE FOR DIVERTING LIGHT THROUGH A PLURALITY OF OPTICAL CONDUCTOR RODS

Kei Mori, 3-16-3-501, Kamiogе, Setagaya-ku, Tokyo, Japan

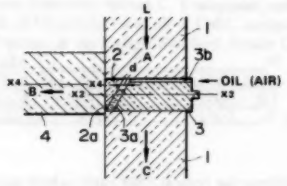
Filed Dec. 3, 1984, Ser. No. 677,159

Claims priority, application Japan, Dec. 27, 1983, 58-248949

The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.

Int. Cl.[4] G02B 6/26

U.S. Cl. 350—96.15 **8 Claims**



1. A light diverting device comprising a first optical conductor rod for receiving light from a light source having an axis in an axial direction and a through-hole in a radial direction, said through-hole comprising first and second portions, a second optical conductor rod having an axis and being tightly inserted into said through-hole in said first portion and firmly fixed therein, said second optical conductor rod having a first edge surface inclined in relation to the axis of said first optical conductor rod for diverting light from said first optical conductor rod, a third optical conductor rod tightly inserted into the second portion of said through-hole, said third optical conductor rod having a second inclined edge surface for engaging said first inclined edge surface of said second optical conductor rod, the first and second edge surfaces defining an inclined spaced therebetween, a fourth optical conductor rod having an axis and being firmly fixed on an outer circumferential surface of said first optical conductor rod to cover the first portion of said through-hole to receive light diverted from said second optical conductor rod, optical oil enclosed in said inclined space at a variable level between the first and second inclined edge surfaces, means for moving said third optical conductor rod in said through-hole to vary the level of optical oil, wherein the inclined space defined between said first and second inclined edge surfaces is formed off the axis of said first optical conductor rod toward said fourth optical conductor rod, and the axis of said fourth optical conductor rod is located nearer to the light-source than the axis of said second optical conductor rod.

4,684,210

LIGHT TRANSMISSION DEVICE

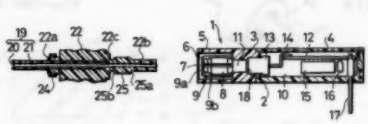
Hiroshi Matsunaga; Yoji Shimojima; Ichiro Tokunaga, all of Furukawa, and Kosei Obata, Miyagi, all of Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Feb. 6, 1985, Ser. No. 698,562

Claims priority, application Japan, Jun. 22, 1983, 58-94919

Int. Cl.[4] G02B 7/26

U.S. Cl. 350—96.20 **3 Claims**



1. In a light transmission device in which a cylindrical plug fitted to the outer periphery of an optical fiber at its end portion is inserted into a plug insertion hole formed in a receptacle of a light transfer device having an optical converter element therein,

the improvement comprising:

said plug having a front end surface to be spaced a predetermined distance from an end surface of said optical converter element when said plug is inserted in said receptacle;

a spacer having a thickness corresponding to said predetermined distance interposed in contact between said end surfaces of said plug and said optical converter element;

said plug having on an outer periphery thereof spaced from its front end surface a flange having a rearwardly facing ramp engagement surface tapered at an angle to a centerline axis of said plug;

said receptacle having in its insertion hole a flexible engagement portion extending in the axial direction toward the opening of said insertion hole and radially spaced from the centerline axis so as to allow said plug to be inserted therein, said flexible engagement portion having at an end toward said insertion hole an engagement protrusion having a frontwardly facing ramp engagement surface tapered at an angle to the centerline axis,

wherein said flexible engagement portion elastically urges and holds said plug against said spacer in contact with said end surface of said converter element, so that said predetermined distance between the two end surfaces is securely maintained, by said frontwardly facing ramp engagement surface of said engagement protrusion elastically and slidably bearing against said rearwardly facing ramp engagement surface of said flange on said plug.

4,684,211

FIBER OPTIC CABLE PULLER

Robert N. Weber, Hummelstown, and William J. Stape, Lewisberry, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 1, 1985, Ser. No. 707,480

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.20 **3 Claims**

1. An apparatus for pulling fiber optic cable which comprises:

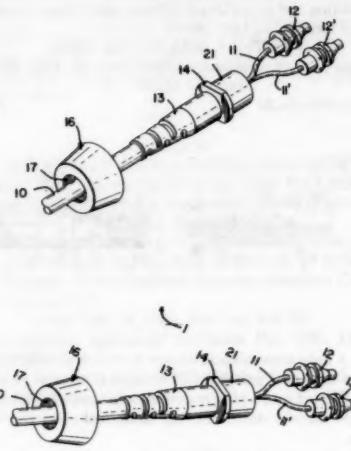
(a) an elongated housing having a closed forward end, an open rearward end, and a hollow portion for reception of a pre-terminated fiber optic cable including one or more ferrules terminated in corresponding ferrules which rest

within the housing and which are inserted into said hollow portion from said rearward end;

(b) grasping means provided on the closed forward end of said housing;

(c) fiber optic cable mounting means provided on said rearward end of said housing said mounting means comprising a threaded nose adapted for attachment to a load-bearing strain relief portion of said cable; and

(d) attachment means to attach said nose to said strain relief portion of said cable and comprising a threaded nut of said strain relief portion to engage threadably the nose.



4,684,212

DETACHABLE OPTICAL CONNECTOR

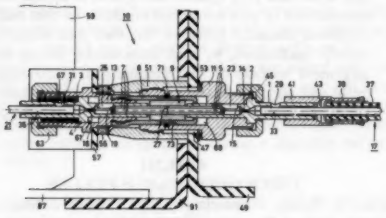
Jan van der Vegte, and Dirk G. Hek, both of Hilversum, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 3, 1981, Ser. No. 270,161

Claims priority, application Netherlands, Jun. 19, 1980, 8003545

Int. Cl.[4] G02B 6/38

U.S. Cl. 350—96.21 **8 Claims**



1. A detachable connector for coupling pairs of optical fibers, said connector comprising:

first and second pin holders, each pin holder having a bore therein;

first and second fiber guides having clamped ends and free ends, the clamped ends being clamped in the bores of the first and second pin holders, respectively, each of said fiber guides comprising at least one pin and having an elongate duct for accommodating an end of an optical fiber;

means for coupling the first and second fiber guides, said coupling means being arranged on the free end of the second fiber guide and having a circularly cylindrical duct in which the free ends of both fiber guides are arranged and aligned when the connector is coupled;

first and second supports in which the first and second pin holders, respectively, are secured, the first support having a recess with an inner surface in which the entire free end of the first fiber guide is located, the free end of the second fiber guide extending beyond the second support; and

a protective cap, fully enclosing the coupling means and the free end of the second fiber guide, said cap having an opening in an end thereof for the insertion of the free end of the first fiber guide, the end of the protective cap projecting beyond the free end of the second fiber guide and having inwardly projecting means for retaining the coupling means on the free end of the second fiber guide, the protective cap having an outer surface with dimensions which match the dimensions of the inner surface of the recess in the first support.

4,684,213

SUBMARINE OPTICAL FIBER CABLE WITH DAM MEANS

Koushi Ishihara; Yasuji Murakami; Nobuyuki Yoshizawa, all of Mito, and Kiyoshi Funaki, Yokohama, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation and Ocean Cable Co., Ltd., both of Tokyo, Japan

Filed May 14, 1984, Ser. No. 609,889

Claims priority, application Japan, May 24, 1983, 58-77066[U]; Jul. 21, 1983, 58-131815

Int. Cl.[4] G02B 6/44

U.S. Cl. 350—96.23 **7 Claims**

1. In a submarine optical fiber cable which includes an optical fiber unit comprising a tension member, at least one optical fiber core and a buffer layer of an insulating material covering said tension member and said optical fiber core together, a pressure resisting sheath mounted on said optical fiber unit and comprising an inner metal tube mounted on said buffer layer, tension wires helically wound on said inner metal tube and an outer metal tube mounted on said tension wires, and a waterproof outer jacket, the improvement which comprises

a plurality of outer dam means each of a certain longitudinal length and provided in corresponding spaces between said inner and said outer metal tubes and tension wires at predetermined intervals, to prevent water from flowing longitudinally in said spaces, and inner dam means disposed in the interior of said inner metal tube, said inner dam means being arranged to prevent water from flowing longitudinally along said optical fiber unit in said interior of said inner metal tube, said inner dam means being disposed at a plurality of positions corresponding to the locations of said plurality of outer dam means along said cable so that portions of each of said outer dam means are coextensive with corresponding portions of said inner dam means in the longitudinal direction, and water is prevented by the coextensive portions of said inner and said outer dam means from otherwise flowing longitudinally in said cable alternatingly between outer and inner cable spaces bounded by said outer and said inner dam means when said inner metal tube has a longitudinal gap.

4,684,214
CABLE WITH A FRICTION REDUCING OUTSIDE LAYER

Horst Goldmann, Woerthsee; Ernst Mayr, Starnberg, and Ulrich Oestreich, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 28, 1984, Ser. No. 687,172

Claims priority, application Fed. Rep. of Germany, Jan. 4, 1984, 3400202

Int. Cl.⁴ G02B *6/04*

U.S. Cl. 350—96.23 **16 Claims**

1. In a cable having an outside jacket, the improvement comprising layer means for reducing the friction on the surface of the outside jacket, said layer means consisting of a wax layer having a good adhesion to the outside jacket, said wax layer having a thickness of only a few μm and being formed from a wax solution.

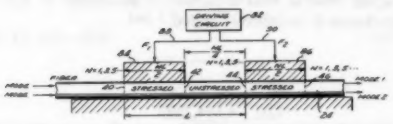
4,684,215
SINGLE MODE FIBER OPTIC SINGLE SIDEBAND MODULATOR AND METHOD OF FREQUENCY

Herbert J. Shaw, Stanford; Robert C. Youngquist, and Janet L. Brooks, both of Mountain View, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Nov. 30, 1983, Ser. No. 556,636

Int. Cl.⁴ G02B *6/02, 5/30;* G02F *1/11*

U.S. Cl. 350—96.29 **37 Claims**



1. A fiber optic frequency shifter comprising:

a single optical fiber for guiding light having a wavelength, said fiber having two predetermined modes of propagation, each of said modes having a different propagation velocity, said fiber having a beat length for said two predetermined modes at said wavelength of said light; and

means for generating a travelling stress wave having a predetermined wavelength for propagation longitudinally along a continuous length of said single fiber, said continuous length comprising plural beat lengths of said fiber, the predetermined wavelength of said travelling stress wave selected in accordance with the beat length for said two predetermined modes of said fiber to cause cumulative coupling of light from one of said modes to the other of said modes through said plural beat lengths, said travelling stress wave interacting with the light to cause the coupled light to be shifted in frequency.

37. A method of frequency shifting, comprising:

introducing an optical signal into an optical fiber;

propagating a travelling stress axially along a continuous length of said fiber, said stress interacting with said optical signal along said length of said fiber to cause said frequency shifting;

guiding said optical signal within said fiber during said interacting of said stress and said optical signal to prevent said optical signal from escaping said fiber.

4,684,216
AUTOMOTIVE OUTSIDE REARVIEW MIRROR

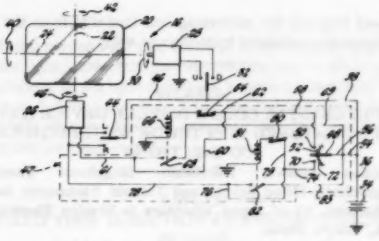
Bernhard Neumann, Russelsheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 29, 1985, Ser. No. 759,953

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1984, 3427988

Int. Cl.⁴ G02B *7/18, 17/00*

U.S. Cl. 350—279 **3 Claims**



1. A rear view mirror mountable on the outside of the driver's door of a motor vehicle and being supported for adjustable movement about a substantially vertical axis and a substantially horizontal axis, a first electric motor and a second electric motor operatively connected to said mirror for pivoting said mirror about said vertical axis and said horizontal axis, respectively, a first electric circuit including first switch means connected to said first electric motor and said second electric motor for selectively energizing said first and second motors for positioning said mirror about said vertical and horizontal axes, and a second electric circuit for moving said mirror towards the driver of the motor vehicle from a predetermined driving position of the mirror to a nonglare position so as to eliminate the glare from the headlights of a following vehicle, said second electric circuit being connected to said first electric motor and including second switch means and a timing means for causing said first electric motor to rotate said mirror about said vertical axis from said predetermined driving position to said nonglare position where said mirror automatically stops after said second switch means is momentarily moved to an operative position.

4,684,217
HYDROFLUORIC ACID-RESISTANT COMPOSITE WINDOW AND METHOD FOR ITS FABRICATION

Carl A. Ostenak, Santa Fe, and Harold A. Mackay, Los Alamos, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 18, 1985, Ser. No. 756,101

Int. Cl.⁴ G02B *27/02*

U.S. Cl. 350—319 **14 Claims**

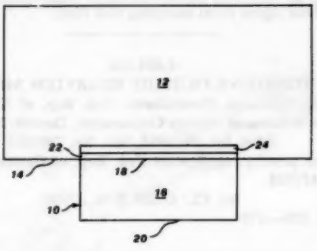
1. A hydrofluoric acid-resistant composite window for visual acess to an environment containing hydrofluoric acid, said composite window comprising:

a. a window, said window having first and second sides, said first side being effective for orientation towards the environment containing hydrofluoric acid, said second side being located opposite said first side:

b. an adhesive disposed on said first side and cured to remove contained bubbles; and

c. a layer of hydrofluoric acid-resistant transparent material,

said layer being disposed on said adhesive and held thereby over said first side, said layer completely covering



said first side for protecting said first side from the environment containing hydrofluoric acid.

4,684,218

LIQUID CRYSTAL COLOR DISPLAY DEVICE HAVING TWO-LAYERED ELECTRODE WITH PINHOLE CONNECTIONS

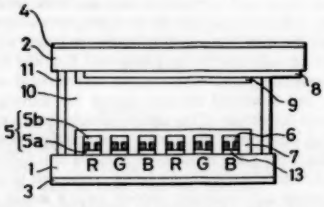
Masandou Aizawa, Yokohama; Shigekazu Yamauchi, Sagamihara; Hisao Sekine, and Takeshi Yamamoto, both of Yokohama, all of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Oct. 27, 1986, Ser. No. 923,426

Claims priority, application Japan, Nov. 26, 1985, 60-263851; Sep. 10, 1986, 61-211508

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—339 F **8 Claims**



1. A liquid crystal color display device comprising: a two-layer structured transparent electrodes in an identical pattern provided on a transparent sustrate forming a liquid crystal; color filter membranes disposed between said two-layered transparent electrodes by an electrical setting method; and a plurlaity of pinholes formed on said color filter membrane, through which said first layer and second layer transparent electrodes are electrically connected to each other.

5. A process for manufacturing a liquid crystal color display device comprising the steps of:

forming by a photoetching method a first layer electrode on a transparent substrate of a liquid crystal cell;

forming photoresists in a dot form on the first layer transparent electrode by a photolithographic method and coating a color filter membrane afterward by an electric setting method;

forming a plurality of pinholes in a dot form on the color filter membranes by removing the photoresists after heating the transparent substrate within a tentative baking temperature in which said photoresists dissolve but the color filter membranes do not dissolve in the dissolving solution; heating the substrate at the main baking temperature which hardens the color filter membranes formed with pinholes;

forming a second layer transparent electrode on the hardened color filter membranes by the photoetching method utilizing a photo mask the same as the one used for forming the first layer transparent electrode;

and the two-layered transparent electrodes being connected electrically through said pinholes.

4,684,219

DISPLAY CELL WITH SELF-SEALING, COLLAPSING PLUG

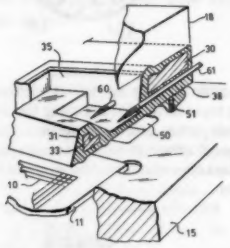
Allen R. Cox; Anthony C. Lowe, and John C. Wood, all of Hampshire, United Kingdom, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1985, Ser. No. 812,209

Claims priority, application European Pat. Off., Feb. 1, 1985, 85300016.4

Int. Cl.[4] G02F *1/133, 1/25*

U.S. Cl. 350—343 **15 Claims**



1. An electro-optic display cell having an arrangement of display electrodes in contact with a liquid within a sealed enclosure, the enclosure comprising:

impervious cover means comprising a transparent window, a rigid structural member forming part of the enclosure wall, a seal between the cover means and the structural member and an elastomeric plug extending between the exterior and interior of the enclosure, the plug having at least one filling perforation therethrough which is collapsed over at least a portion of its length so that the enclosure is completely sealed.

4,684,220

2-PHENYLPYRIDINE DERIVATIVES AND LIQUID CRYSTAL COMPOSITIONS INCLUDING SAME

Yoshio Shionozaki; Hiroshi Mukai; Tsuyoshi Obikawa, and Shuhei Yamada, all of Suwa, Japan, assignors to Seiko Epson Kabushiki Kaisha, Tokyo, Japan

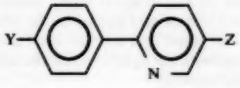
Filed Jul. 11, 1985, Ser. No. 754,056

Claims priority, application Japan, Jul. 12, 1984, 59-144848; Oct. 11, 1984, 59-213073; Mar. 27, 1985, 60-62553

Int. Cl.[4] C09K *19/34*; G02F *1/13*; C07D *239/72, 241/36, 241/46, 239/02*

U.S. Cl. 350—350 R **12 Claims**

1. 2-phenylpyridine derivatives represented by the general formula:



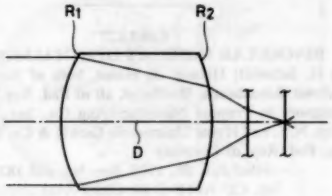
wherein Y is RO—, Z is a straight chain pentyl group, and R is a straight chain alkyl group having from 1 to 12 carbon atoms.

4,684,221

GRADED REFRACTIVE INDEX SINGLE LENS SYSTEM

Katsuhiro Takada, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 13, 1986, Ser. No. 818,607
Claims priority, application Japan, Jan. 16, 1985, 60-3997
Int. Cl.[4] G02B 3/00
U.S. Cl. 350—413 15 Claims



1. A graded refractive index single lens system comprising at least one surface formed spherically, having refractive index n expressed by the formula shown below wherein n_0 represents the refractive index on the optical axis of said lens and r represents the radial distance from the optical axis, and satisfying the conditions (1) and (2) shown below:

$$n^2=n_0^2[1-(gr)^2+h_4(gr)^4+h_6(gr)^6+h_8(gr)^8+h_{10}(gr)^{10}]$$

$$-1.5<1/h_8<2 \quad (1)$$

$$-5<h_{10} \quad (2)$$

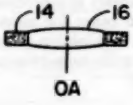
where g is a parameter representing the degree of the gradient of the refractive index distribuiton, and h_4, h_6, h_8 and h_{10} respectively represent the higher order coefficients of said refractive index distribution.

4,684,222

SMALL ANAMORPHIC LENSES AND METHOD

Nicholas F. Borrelli, Elmira, and David L. Morse, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed May 30, 1984, Ser. No. 615,254
Int. Cl.[4] G02B 13/08
U.S. Cl. 350—420 4 Claims



1. A monolithic optical element comprising at least one light transmitting glass anamorphic lens bounded by a curved light-refracting surface, and material surrounding the lens which is of the same chemical composition but of higher density than the glass comprising the light-transmitting lens.

4,684,223

ZOOM LENS OF THE REAR FOCUSING TYPE

Keiji Ikemori, Kanagawa, and Masatake Kato, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

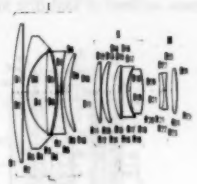
Continuation of Ser. No. 442,573, Nov. 18, 1982, abandoned.
This application Jan. 15, 1986, Ser. No. 819,991
Claims priority, application Japan, Nov. 26, 1981, 56-190034
Int. Cl.[4] G02B 9/64, 15/177
U.S. Cl. 350—427 3 Claims

1. A rear focusing zoom lens for zooming over a zooming range, comprising:

a plurality of optical lens units;

a movable lens unit movable for focusing arranged on the image side of said optical lens units;

said optical lens units and said movable lens unit being simultaneously moved for zooming, and said movable lens unit



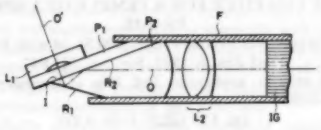
being moved such that the ratio of the incident angle α of the light incident on the movable lens unit to the emergent angle α' of the light therefrom is always maintained larger than 1 during zooming when the light ray from an infinitely distant object is introduced to the rear focusing zoom lens and traced.

4,684,224

FIELD VIEW DIRECTION CHANGING OPTICAL SYSTEM

Nobuo Yamashita, and Susumu Takahashi, both of Hachiouji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 9, 1983, Ser. No. 550,206
Claims priority, application Japan, Nov. 10, 1982, 57-197401
Int. Cl.[4] G02B 17/00, 23/26
U.S. Cl. 350—445 3 Claims



1. A field of view direction changing optical system comprising, for an observation field of view having an optical axis, an incident face of the system intersecting at a right angle with the optical axis of the light from the observation field of view, an image transmitting optical system having an optical axis intersecting the optical axis of the light from the observation field to view at an angle θ, a first reflecting face forming an angle $\theta/2$ with respect to said incident face and a second reflecting face disposed on the same face as said incident face and satisfying the condition $n_1/n_2<\sin\theta$ when the refractive index of the light incident side with respect to said second reflecting faces is denoted as n_1 and the refractive index of the side opposite to said light incident side is denoted as n_2.

4,684,225

CABLE DRIVE FOCUSING MECHANISM FOR OPTICAL INSTRUMENTS

James A. Clark, Honeoye Falls, and Michael H. Dobner, Webster, both of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Sep. 14, 1984, Ser. No. 650,756
Int. Cl.[4] G02B 21/26
U.S. Cl. 350—518 32 Claims

1. In a microscope having a stationary member and a member slidably mounted thereto for supporting thereon either a stage assembly or an optical head assembly, apparatus for

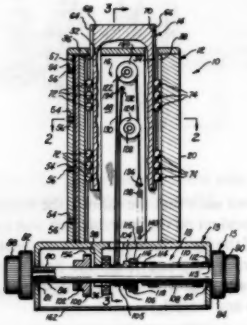
moving said stage assembly or said optical head assembly relative to the stationary member, comprising:

(a) a stationary first member;

(b) a movable second member mounted to said stationary first member for movement parallel to said first member;

(c) a shaft rotatably supported by said stationary first member;

(d) first means secured to said first member;



(e) second means secured to said second member; and

(f) drive means having opposite ends mounted to said first member, said drive means forming a closed loop which couples together said first means, said second means and said rotatable shaft whereby rotation of said rotatable shaft causes said drive means to move said second member parallel to said first member.

4,684,226

TEMPLE END PIECE FOR A TEMPLE OF A SPECTACLE FRAME

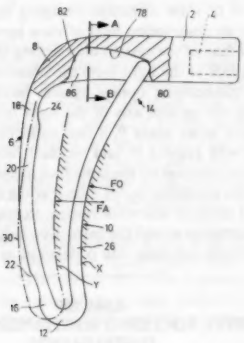
Wilhelm Anger, Via Brattas 4, CH-7500 St. Moritz, Switzerland

Filed Jun. 6, 1985, Ser. No. 741,847

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1984, 3446184

Int. Cl.[4] G02C *5/14, 3/00*

U.S. Cl. 351—123 **23 Claims**



1. A temple end piece for a temple of a spectacle frame having an essentially straight first segment extending in the longitudinal direction of the temple, an elongated fitting segment intended for contacting the head and/or behind the ear and extending downwardly with respect to the first segment, and a connecting segment connecting the first segment to the fitting segment at or below the longitudinal middle of the fitting segment whereby at least the upper half of the fitting segment constitutes an end region projecting freely upwardly toward said first segment, from a transition area between the connecting and the fitting segments, the upper end of the fitting segment being engageable with the first segment in such a manner that said upper end can be moved freely in the longitudinal direction of the first segment from a first position rewardly toward said connecting segment and simultaneously the upper end of the fitting segment is enclosed by the first segment.

4,684,227

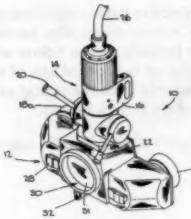
BINOCULAR INDIRECT OPHTHALMOSCOPE

Otto H. Schmidt; Helmut A. Heine, both of Herrsching, and Helmut Rosenbusch, Weilheim, all of Fed. Rep. of Germany, assignors to Propper Manufacturing Co., Inc., Long Island City, N.Y. and Heine Optotecnik GmbH & Co. KG, Herrsching, Fed. Rep. of Germany

Filed Jan. 28, 1985, Ser. No. 695,183

Int. Cl.[4] A61B *3/10;* **G02B** *7/02, 21/06*

U.S. Cl. 351—205 **12 Claims**



1. In a binocular stereoscopic viewing device which includes an observation unit, means for projecting light into the observation unit, spaced eyepieces secured to the observation unit through which a user views an object to be observed, an optical aperture into the observation unit through which light passes between the object to be observed and the interior of the observation unit, and optical means disposed in the observation unit for optically coupling the eyepieces and the light-projecting means with the aperture including a first optical element optically coupling one eyepiece and the aperture, a second optical element optically coupling a second eyepiece and the aperture, and a third optical element optically coupling the light projecting means and the aperture, the improvement comprising a support structure which supports the first, second and third optical elements in a predetermined, fixed relationship relative to each other for movement together in said predetermined, fixed relationship within the observation unit and means for moving the support structure including a single user-actuable control.

4,684,228

PHOTOSETTING APPARATUS

Bernd Holthusen, Hamburg, Fed. Rep. of Germany, assignor to Scangraphic Dr. Boger GmbH, Wedel, Fed. Rep. of Germany

Filed Aug. 15, 1986, Ser. No. 896,914

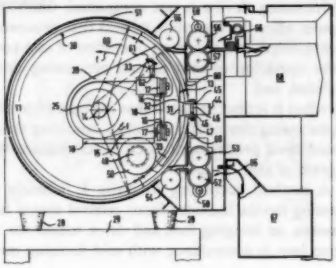
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1985, 3531458

Int. Cl.[4] G03B *41/00*

U.S. Cl. 354—4 **29 Claims**

1. A photosetting apparatus comprising a transparent segment of a regular cylinder around which a photosensitive material can be laid with the photosensitive layer towards the inside, and a rotary mirror illuminated by a laser beam modulated in accordance with the symbols to be set, wherein the rotary mirror is arranged with the laser, the modulator and the image forming optical system on a carriage displaceable in controlled manner along the axis of said segment, and wherein the rotary mirror generates a radial scanning beam which leaves the cylinder axis and executes a rapid periodic scanning

movement in the peripheral direction of said segment, characterised in that said segment (11) of a regular cylinder is held at its end faces at two plate-like basic members (12) which rest on a support (29) and which are connected into a rigid arrangement by a tie beam (13) arranged radially spaced apart from the



cylinder axis (14) and carried only by the basic members (12), with the tie beam being preferably adjustable relative to the basic members (12) perpendicular to the cylinder axis; and in that the carriage (15) is axially displaceably held on the tie beam (13).

4,684,229

PHOTOGRAPHIC CAMERA

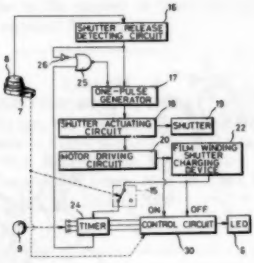
Mikio Utsugi, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 30, 1985, Ser. No. 782,594

Claims priority, application Japan, Oct. 1, 1984, 59-147279; Oct. 1, 1984, 59-147280

Int. Cl.[4] G03B *17/24, 7/00*

U.S. Cl. 354—106 **12 Claims**



1. In a camera having a camera body, a shutter and an exposure frame defining an exposure aperture in the camera body at the back of which frame a film having at least one image area on which images are formed by shutter operation is located, the improvement comprising:

light emitting means disposed in said exposure frame for emitting light to which said film is exposed to form on said film at least one optical mark representing a condition of the camera under which said film is exposed;

control means responsive to said condition of the camera and associated with said light emitting means for controlling the emission of light from said light emitting means; and

film winding means adapted to continuously wind said film across said exposure frame from the beginning to the end of said film and to rewind said film, frame by frame, one frame being rewound after each exposure by said shutter operation, said light emitting means forming said optical mark indicating that said film has been exposed from the last frame toward the first frame of said film.

4,684,230

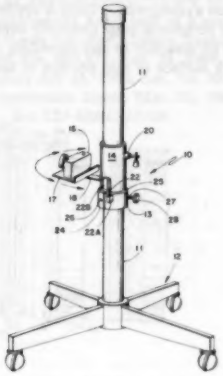
COLLAR FOR RETAINING CAMERA BRACKET MOUNT IN PLACE

Steven A. Smith, 5329 Michaele La., Minnetonka, Minn. 55345

Filed Oct. 9, 1986, Ser. No. 917,216

Int. Cl.[4] G03B *17/00*

U.S. Cl. 354—293 **3 Claims**



1. In combination with an upright support for a photographic camera assembly, the support having a base means and a camera receiving post extending upwardly therefrom, clamping means for releasable attachment to the post at a predetermined elevation in camera supporting position immediately below a camera mounted on said post; the improvement comprising:

(a) said clamping means including an adjustable collar having first and second semi-circular segments with threaded screw means secured to said first segment and engaging said second segment for releasably holding said first and second segments in post-gripping disposition and at a predetermined elevation on said post; and

(b) a radially extending housing extending radially outwardly from one of said semi-circular segments and releasably retaining a camera position locking pin therein, said camera position locking pin being arranged for axial movement to an elevation above the upper surface of said first and second collars within said radially extending housing for engagement with a camera assembly mounted upon said upright post axially adjacent said clamping means, the arrangement being such that said photographic camera assembly is supported by said adjustable collar.

4,684,231

CAMERA FILTER ADAPTOR SYSTEM

Dale A. Athy, 1718 E. Beverly La., Phoenix, Ariz. 85022

Filed Jan. 6, 1986, Ser. No. 816,310

Int. Cl.[4] G03B *11/00*; G02B *7/00*

U.S. Cl. 354—295 **3 Claims**

1. In combination with a camera, said camera including a cylindrical housing having a light focusing lens and having an internally threaded hollow cylindrical wall portion forward of the lens, light entering said lens in a direction of travel generally perpendicular to the face of said lens,

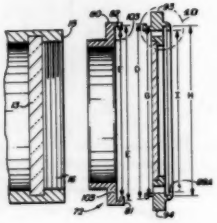
a light filtering system including,

(a) a hollow adapter member having a housing with an externally threaded rear portion sized to turn into and engage said internally threaded lens housing and having a forward portion with a lip extending outwardly from said forward portion;

(b) a first filter member detachably secured to said adapter housing and including

(i) a hollow housing having

a front surface,
a rear surface,
an outer peripheral edge circumscribing said housing,
at least one slot formed through said housing and extending from said rear surface to said front surface and spaced away from said peripheral edge, the portion of said housing intermediate said slot and said peripheral edge being resiliently inwardly deflectable when a compressive force is applied to said portion of said peripheral edge generally centered over said slot,
a first lip attached to and extending ouwardly from said back surface of said portion of said housing intermediate said slot and said peripheral outer edge, said lip being shaped and dimensioned to removably interlock with said lip of said adaptor, and



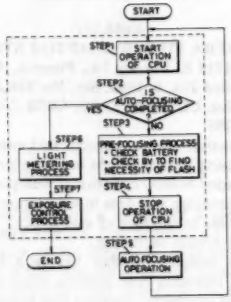
(ii) a filter mounted in said filter member housing,
said filter member being attached to said adaptor by grasping said peripheral edge with the fingers of a hand, compressing the intermediate portion of said housing with the fingers, moving said filter member lip into said adaptor in said direction of travel of light into said lens, and relaxing said fingers to release the compression on said intermediate portion of said housing to permit said intermediate portion and said first lip to outwardly resiliently expand such that said first lip interlocks with said adaptor lip.

4,684,232

METHOD AND APPARATUS FOR CONTROLLING OPERATION OF CAMERA

Kazuyuki Kazami, Tokyo, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Mar. 20, 1986, Ser. No. 841,619
Claims priority, application Japan, Mar. 26, 1985, 60-61718
Int. Cl.[4] G03B *3/00, 7/00*
U.S. Cl. 354—400 **12 Claims**



1. In a camera having first and third processing devices controlled in accordance with a program of a computer, and having a second processing device controlled independently of the program of said computer, a method for sequentially executing the operation of the first, second, and third processing devices, comprising the steps of:
(a) enabling said computer;
(b) discriminating completion of the operation of said second processing device by said computer;
(c) when it is discriminated that the operation of said second processing device is not completed, disabling said computer after the operation of said first processing device is completed, and resuming operation of said computer after the operation of said second processing device is completed; and
(d) when it is discriminated that the operation of said second processing device is completed, executing the operation of said third processing device in accordance with the program of said computer.

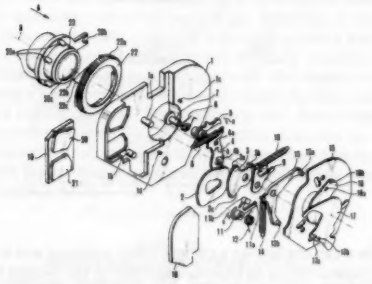
2. A method according to claim 1, wherein said second processing device includes focus control means having focusing means, an imaging lens and drive means for moving said imaging lens in accordance with said focusing means.

4,684,233

PHOTOGRAPHIC OPTICAL SYSTEM DRIVE DEVICE FOR CAMERA

Takanori Kodaira, Tokyo; Akihiro Namai, Kanagawa, and Akira Egawa, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 4, 1986, Ser. No. 835,966
Claims priority, application Japan, Mar. 14, 1985, 60-036900[U]; Mar. 14, 1985, 60-036901[U]
Int. Cl.[4] G03B *3/10*
U.S. Cl. 354—400 **19 Claims**

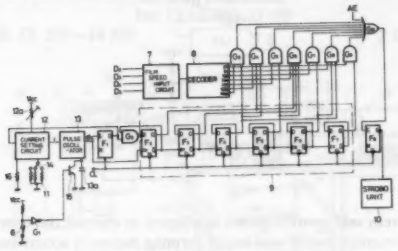


15. An optical drive device, comprising:
(a) an optical system shiftable from a first portion toward a second position, said optical system having a possibility of returning to a position different from said first position instead of returning to said first position;
(b) drive means for driving said optical system from said first position toward said second position;
(c) detection means for detecting an initial position of said optical system when said optical system shifts a predetermined amount from said first position toward said second position; and
(d) control means for controlling the drive of said optical system by said drive means, wherein said control means starts counting the drive amount of said optical system from when said detection means detects the initial position.

4,684,234
STROBO CONTROL CIRCUIT

Kohno Takanori, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Jul. 21, 1986, Ser. No. 888,472
Claims priority, application Japan, Jul. 27, 1985, 60-166610
Int. Cl.[4] G03B *15/05, 7/16*
U.S. Cl. 354—421 **7 Claims**



1. A strobo control circuit in which a trigger pulse for flashlight illumination is applied to a strobo unit at a time when an aperture of shutter blades having a function of a diaphragm which aperture is increased with the lapse of an exposure time is a proper value determined in accordance with the amount of illumination of the strobo unit, a distance to a subject being photographed and a film speed, comprising:

means for generating a basic pulse having a period determined in accordance with the distance;

a counter which starts counting operation thereof by said basic pulse in interlocked relationship with opening operation of said shutter blades;

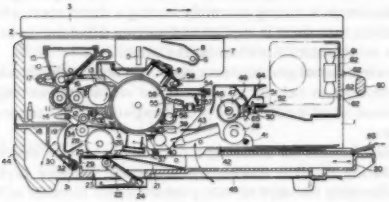
a film speed input circuit for inputting the film speed in the form of a digital code;

trigger signal generating means for applying the trigger signal to the strobo unit at a time when said counter counts said basic pulse by the number of times corresponding to said digitally inputted film speed.

4,684,235
IMAGE FORMING APPARATUS

Yujiro Kohmoto, Hyogo, and Yoshihiro Tanimoto, Himeji, both of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Nov. 19, 1985, Ser. No. 799,440
Claims priority, application Japan, Nov. 27, 1984, 59-249847
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—3 R **14 Claims**



1. An image forming apparatus comprising

a body part having an operating posture during normal image forming operation and being movable to a second different posture,

means defining a paper passing route,

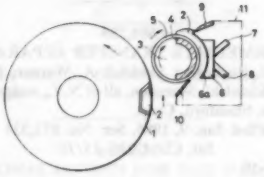
sensing means for sensing the posture of the body, at least part of said sensing means being interposed in the paper passing route, so that said sensing means also senses whether paper is within said paper passing route proximate to said sensing means,

means for stopping the image forming operation when said sensing means senses that said body is in the second posture.

4,684,236
TONER CONCENTRATION DETECTING DEVICE FOR DRY TYPE ELECTROGRAPHIC COPY MACHINE

Yoshio Inoue, and Matsuyuki Aoki, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 583,475, Feb. 24, 1984, abandoned.
This application Jul. 25, 1986, Ser. No. 887,985
Claims priority, application Japan, Mar. 10, 1983, 58-38139
Int. Cl.[4] G03G *15/08*
U.S. Cl. 355—3 DD **7 Claims**



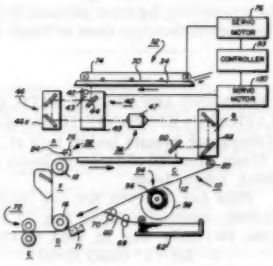
1. In an electrophotographic copying machine wherein developer is carried along a flowpath, a toner concentration detecting device comprising:

a detection roll carrying a magnet for attracting developer onto said detection roll and rotating adjacent said flowpath, wherein a light reflecting sleeve is disposed upon the outer periphery surface of said detection roll, and a detection station adjacent said detection roll for detecting the amount of toner in the developer carried from said flowpath to said detection station by said detection roll, said detecting device further comprising restriction means adjacent said detection roll between said flowpath and upstream of the detection station for restricting the amount of developer carried to said detection station.

4,684,237
SCAN ASSEMBLY MOVED BETWEEN ALTERNATE POSITIONS TO PREVENT PLATEN OVERHEATING

Wayne A. Buchar, Holcomb, and James P. Russell, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 27, 1985, Ser. No. 780,775
Int. Cl.[4] G03G *15/28, 21/00*
U.S. Cl. 355—8 **4 Claims**



1. In an electrophotographic document reproduction apparatus wherein documents in at least one mode of operation are transported across the surface of a transparent support member, an imaging and control system for forming latent images

of the moving document, during successive exposure cycles, at a photoreceptor surface, the imaging and control system including:

means for scan/illuminating an incremental strip of said support member, said means held stationary during each said exposure cycle,

a lens for projecting reflected images of said incrementally scanned document onto said photoreceptor surface to form a latent image of the document thereon,

means for moving said scan/illumination means between a first and at least a second stationary scan position beneath the support member subsequent to at least a first exposure cycle, and

control means adapted to control the operation of said scan-/illumination means so as to periodically and sequentially move said scan/illumination means between said first and said at least a second position.

4,684,238

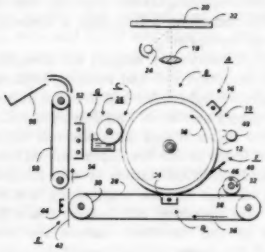
INTERMEDIATE TRANSFER APPARATUS

Henry R. Till, Rochester; Fredrick A. Warner, Fairport, and Charles A. Radulski, Macedon, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jun. 9, 1986, Ser. No. 872,324

Int. Cl.[4] G03G *15/10*

U.S. Cl. 355—10 **10 Claims**



1. An apparatus for transferring a liquid image having at least a liquid carrier with toner particles dispersed therein from a member to a copy sheet, including:

an intermediate member positioned to have at least a portion thereof contacting the member in a transfer zone;

means, located in the transfer zone, for atracting the liquid image from the member to said intermediate member;

means for removing liquid carrier from said intermediate member and compacting the toner particles thereon in image configuration; and

means for transferring the toner particles from said intermediate member to the copy sheet in image configuration.

4,684,239

IMAGE FORMING APPARATUS WITH AUTOMATIC REGULATION IN RESPONSE TO IMAGE DENSITY

Yoshiaki Takayanagi; Masato Ishida, both of Yokohama, and Makoto Miura, Hino, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 16, 1985, Ser. No. 766,406

Claims priority, application Japan, Aug. 22, 1984, 59-175569; Aug. 22, 1984, 59-175571; Aug. 22, 1984, 59-175572

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—14 R **18 Claims**

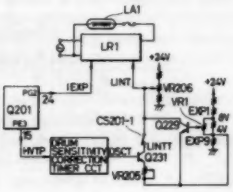
1. An image forming apparatus comprising:

image forming means for forming an image corresponding to an original onto a recording member, said image forming means including exposure means for exposing the original;

detecting means for detecting the image density of the original by receiving light from the original;

regulating means capable of setting the quantity of exposure of said exposure means to a plurality of levels; and

control means for controlling an operative condition of said image forming means in accordance with an output of said detecting means so as to form a suitable density of image,



wherein said control means is adapted to correct the operative condition of said image forming means in accordance with the level of the light quantity set by said regulating means.

4,684,240

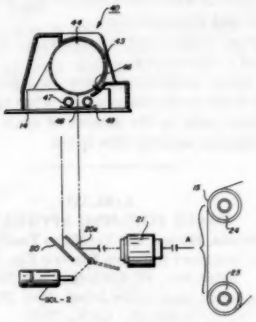
DOCUMENT SCANNING DRUM AND FLASH EXPOSURE COPIER

William G. Miller, East Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 16, 1984, Ser. No. 590,297

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—14 R **1 Claim**



1. An electrostatographic printing system comprising:

a document scanning assembly having a drum upon which a document sheet is applied and a drum drive means having a servo motor for rotating the same,

an electrostatographic processor having a photoreceptor member in belt form and a drive means for moving the same along a path to the processing stations of said processor,

optical means for scanning a document sheet on said drum during rotation thereof for producing imaging rays and directing the rays on said photoreceptor member in flowing sequence during movement thereof, and

control means associated with said drum drive means and said belt drive means adapted to produce a correction signal and to apply the same to one of said drive means in the event the peripheral speed of the document sheet is not equal to the speed of said belt,

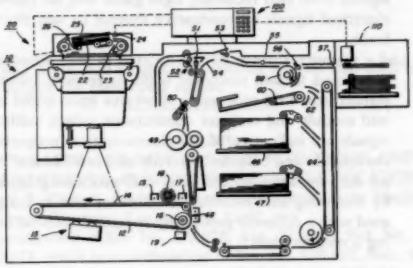
said control means also being adapted to produce a positional signal indicative of the relative positions of said drum and said belt and to apply the same to one of said drive means during an inactive scanning position on said drum.

4,684,241

PLURAL IMAGE DOCUMENT SET COPYING

Thomas Acquaviva, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 541,612, Oct. 13, 1983, Pat. No. 4,568,172.
This application Dec. 16, 1985, Ser. No. 797,288
The portion of the term of this patent subsequent to Feb. 4, 2003, has been disclaimed.
Int. Cl.[4] G03G *21/00*
U.S. Cl. 355—14 SH **2 Claims**



1. A method of more efficiently copying document pages with a copier with a recirculating document handler for making plural precollated plural sheet copy sets from a plural page set of plural document sheets plurally recirculated from the document handler to the imaging station of the copier and back, with controlling said copying by counting the number of document sheets being recirculated and normally controlling the output of said precollated copy sets in separated said sets each containing numbers of copy sheets corresponding to said number of document sheets in said set; the improvement comprising recirculating a set of document sheets having at least two document page images per document sheet side to produce copy sheets with at least two page images per side from said document sheets, and modifying said copying controlling to separate said copy sheets into at least two separate sub-sets of output copy sets, the number of said sub-sets being at least twice the number of document sheets being recirculated in said document handler, and separately binding said output copy sets into said separated collated sub-sets in response to said copier control modification with automatic on-line binding means actuated to separately bind said copy sub-sets.

4,684,242

MAGNETIC FLUID CLEANING STATION

Peter G. Schultz, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

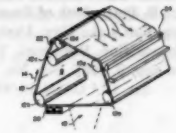
Filed Jan. 27, 1986, Ser. No. 822,375
Int. Cl.[4] G03G *21/00*
U.S. Cl. 355—15 **8 Claims**

1. In an electrographic copier having a movable dielectric member, a station for applying toner to selected areas of the dielectric member, a transfer station whereat most of the applied toner is removed from the dielectric member, and cleaning apparatus for removing residual toner from the dielectric member; the improvement wherein said cleaning apparatus comprises:

wall means defining a cavity open to the dielectric member, and having close-clearance gap regions between said wall means and the dielectric member;

means for supplying magnetially permeable cleaning fluid to said cavity; and

magnetic field producing means magnetically coupled through said cleaning fluid in said gap regions to form a magnetic seal in said gap regions, thereby inhibiting leakage of said cleaning fluid from said cavity through said gap regions.

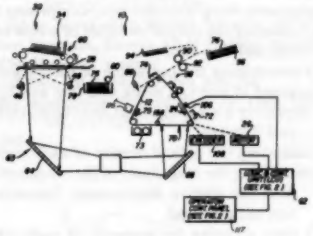


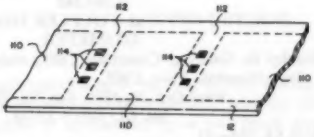
4,684,243

OPTIONAL OUTPUT FOR TEST PATCHES

James C. Minor, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 15, 1986, Ser. No. 863,652
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—14 SH **10 Claims**





1. In an electrographic copy machine of the type having an image transfer member, means for producing document images in an image area of the image transfer member, and means for producing test patch images on the image transfer member, the improvement including apparatus for selectively controlling whether or not the test patch images are transferred from the image transfer member to the copy sheets, said apparatus comprising:

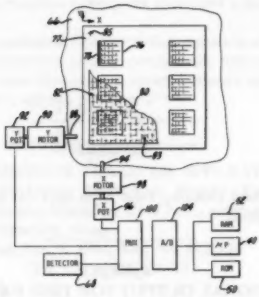
means for selectively aligning or not aligning the copy sheets and the test patches on the image transfer member; and

means for effecting the transfer of images from the image transfer member to a copy sheet aligned with the images to be transferred, whereby the copy sheets receive or do not receive images of the test patches in accordance with the relative positions of the copy sheets and the test patches on the image transfer member.

4,684,244
METHOD OF SCANNING OPTICAL DENSITY PATTERNS

Gene A. Butts, Beaumont; Henry A. Garsee, Kountze; Charles D. Kelley; Bruce R. Petty, both of Beaumont, all of Tex., and James L. Pauley, Salt Lake City, Utah, assignors to Helena Laboratories Corporation, Beaumont, Tex.

Filed Sep. 3, 1985, Ser. No. 771,936
Int. Cl.[4] G01N *33/48*
U.S. Cl. 356—39 10 Claims



1. A method of optically scanning a plurality of blood samples or the like, said samples being arranged in rows and each including a plurality of optical density segments extendidng along a first axis, said segments generally forming columns of like segments along a second axis, comprising the steps of:

(A) scanning the optical densities of a row of said segments along said first axis;

(B) determining the centerline of each segment in the row scanned in step (A) along said first axis by

displacing a scanning head relative to said samples along said first axis,

measuring the optical density of each segment, and

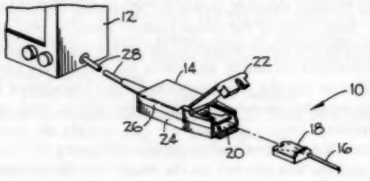
correlating the magnitude of the measured optical density with the relative displacement between said head and said samples; and

(C) then, scanning the segments of each column along the corresponding centerline determined in step (B).

4,684,245
ELECTRO-OPTICAL COUPLER FOR CATHETER OXIMETER

Stanley D. Goldring, Cupertino, Calif., assignor to Oximetrix, Inc., Mountain View, Calif.

Filed Oct. 28, 1985, Ser. No. 791,705
Int. Cl.[4] G01N *33/48*
U.S. Cl. 356—41 10 Claims



1. An optical module for coupling a fiberoptic catheter to a catheter oximeter processing apparatus, said module comprising

an enclosed housing for receiving in light-tight engagement therewithin the end of the fiberoptic catheter including a transmitting light guide and a receiving light guide,

means within said housing for receiving a plurality of electrical leads from said catheter oximeter processing apparatus,

means in said housing for receiving control signals from said electrical leads and for transmitting light signals at a plurality of different wavelengths into said transmitting light guide,

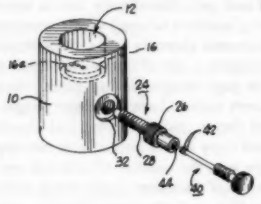
means in said housing for receiving blood reflected light signals from said receiving light guide and for providing electrical signals representative thereof to said electrical leads,

and a memory storage device located in said housing and connected to said electrical leads to receive calibration signals from said processing apparatus upon initial use of said module and catheter combination which calibration signals are indicative of the electro-optical properties of the module and catheter whereby said module and catheter may be disconnected from said processing apparatus by removing said electrical leads from said housing and used with a different processing apparatus without requiring a recalibration.

4,684,246
SOFT CONTACT LENS ANALYZER

Elizabeth A. Downing, and Ronald W. Downing, both of 524 E. Townview Cir., Mansfield, Ohio 44907

Filed Jun. 26, 1985, Ser. No. 748,850
Int. Cl.[4] G01B *9/00*
U.S. Cl. 356—124 13 Claims



1. Apparatus for measuring a soft contact lens comprising:

a lens support defining an inspection station, said support having means for supporting a lens immersed within a liquid to allow the lens to conform to a shape for measurement of the lens; and

bubble forming means for causing a bubble to be trapped beneath a generally concave surface of the lens to allow precise optical determination of the position of an interface between the bubble and the lens.

4,684,247
TARGET MEMBER FOR USE IN A POSITIONING SYSTEM

Harry B. Hammill, III, Williamsville, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

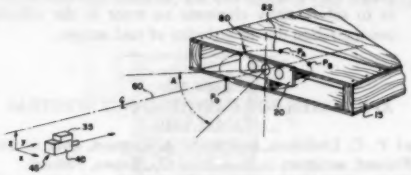
Filed Oct. 18, 1985, Ser. No. 788,989
Int. Cl.[4] G01B *11/26;* G01C *1/00*
U.S. Cl. 356—152 19 Claims

1. A target member for use in a positioning system comprising:

a support member; and

at least three reflector elements mounted on said support member, each of said reflector elements being so configured as to form an image of an identifying means located within a predetermined field of view with respect to said

support member, said images defining a plane oriented other than normal to a line from the identifying means to



said plane, said images also defining a circle that does not include the identifying means.

4,684,248

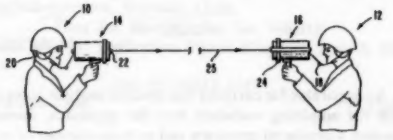
APPARATUS AND METHOD FOR NIGHTTIME AND LOW VISIBILITY ALIGNMENT OF COMMUNICATORS

Robert J. Cinzori, Santa Barbara, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 373,075, Apr. 29, 1982, Pat. No. 4,603,975, which is a continuation of Ser. No. 130,637, Mar. 17, 1980. This application Apr. 25, 1986, Ser. No. 855,663

Int. Cl.[4] G01B *11/26*; G01C *1/00*; H04B *9/00*

U.S. Cl. 356—152 **4 Claims**



1. A hand-held communication unit adapted to receive encoded optical signals transmitted from a remote source, said unit comprising:

detector means for receiving the optical signal and converting it into humanly perceptable information;

focusing means for focusing the optical signal from the source onto portions of the detector;

said detector being further adapted to generate location signals related to the point of incidence of the optical signal on said detector;

a housing for the unit in which said focusing means and detector means are located, said housing including handle means enabling a person to point the unit in the general direction of the remote source;

sighting means mounted to the housing through which the user looks in an attempt to locate the source; and

indicator means located within the sighting means and coupled to the location signal from the detector, adapted to provide the user with a visual indication of the degree of alignment of the communication unit with the source whereby the user can more accurately point the housing towards the source to maintain better communication therewith especially under low visibility conditions.

4,684,249

ANGULAR POSITION SENSORS

Stafford M. Ellis, West Sussex, England, assignor to GEC Avionics Limited, England

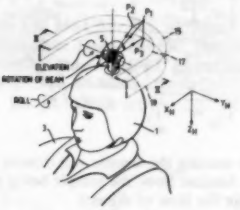
Filed Apr. 3, 1985, Ser. No. 719,287

Claims priority, application United Kingdom, Apr. 9, 1984, 8409146

Int. Cl.[4] G01B *11/26*; G01C *3/00*

U.S. Cl. 356—152 **12 Claims**

1. An angular position sensor for sensing the relative angular position of first and second bodies comprising: three spaced photodetectors arrays each comprising a multiplicity of photodetectors in a linear configuration fixed with respect to said first body; means fixed with respect to said second body for producing a single light beam which executes a cyclic sweeping motion about an axis defined within said second body, such that said light beam successively irradiates a selection of one or more photodetectors within each array during each cycle of its sweeping motion, the selection being dependent on said angu-



lar position; means attached to said second body for producing a time datum signal within each cycle of motion of said light beam; means for determining the locations within the arrays of the selected photodetectors, means for determining the timing of said irradiations with respect to said time datum signals; and means responsive to said locations and said timing to develop an output representative of the relative angular position of said first and second bodies.

4,684,250

SET OF CUVETTES

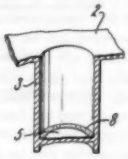
Aarre Kukka; Jukka Tervamäki; Heikki Nikulin, all of Helsinki, and Olavi Vuorinen, Kerava, all of Finland, assignors to Labsystems Oy, Helsinki, Finland

Filed Dec. 20, 1984, Ser. No. 684,285

Claims priority, application Finland, Dec. 22, 1983, 834756

Int. Cl.[4] G01N *21/03*

U.S. Cl. 356—246 **5 Claims**



1. A set of cuvettes comprising at least one cuvette having a measurement window in the bottom thereof, wherein said measurement window is surrounded by a matt-faced area, wherein said matt-faced area is on the inner surface of the bottom of said cuvette.

4,684,251

SPECTROMETER

Geert Brouwer, Waalre, and Sipke Wadman, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 14, 1986, Ser. No. 839,474

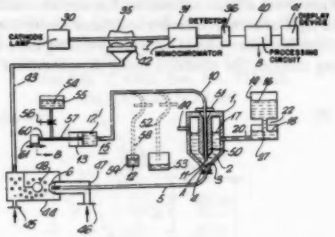
Claims priority, application United Kingdom, Mar. 22, 1985, 8507521

Int. Cl.[4] G01N *21/72*

U.S. Cl. 356—315 **6 Claims**

1. A spectrometer comprising a flame atomiser in the form of a burner, a nebuliser for feeding a sample for analysis entrained in a flow of fuel gas to the burner, a tube for feeding the sample and a diluent to the nebuliser, and means for varying the rate of

flow of the sample into the tube while maintaining constant the total flow of sample and diluent, characterised by delivery



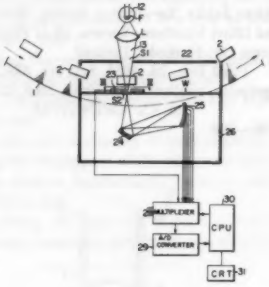
means for causing the sample and diluent to pass through the tube with laminar flow, the sample being entained as a central core within the flow of diluent.

4,684,252

AUTOMATED ANALYZING APPARATUS

Kyoko Makiguchi; Hisayuki Sagusa, both of Katsuta, and Yasushi Nomura, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 556,411, Nov. 30, 1983, abandoned. This application Jul. 16, 1986, Ser. No. 886,765
Claims priority, application Japan, Dec. 1, 1982, 57-209347
Int. Cl.[4] G01J *3/18, 21/27*
U.S. Cl. 356—328 **7 Claims**



1. An automated analyzing apparatus comprising:

a sample chamber having an optical path therein, said sample chamber being arranged for receiving a row of measurement cells passing across the optical path, each measurement cell being arranged for receiving at least a sample to be analyzed;

a spectroscope disposed adjacent to said sample chamber, said spectroscope having an entrance slit;

light source means for providing white light for illuminating said measurement cell within said sample chamber, light from said light source means passing along the optical path of said sample chamber through said measurement cell so as to be incident in said spectroscope through said entrance slit and being scattered by a grating into first detector means arranged for detecting a plurality of individual light wavelengths and for providing an output indicative thereof;

second detector means for detecting scattering light scattered from said measurement cell upon illumination of said measurement cell by said light source means, said second detector means being disposed within said sample chamber so as to surround said entrance slit and providing an output of the detected scattering light; and

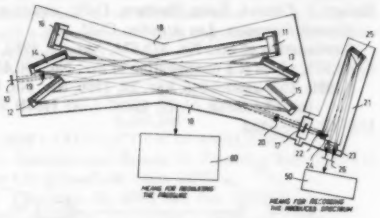
means for calculating the concentration of components of said sample in said measuring cell on the basis of the output of said first detector means, said calculating means being responsive to the output of said second detector means for compensating the calculated concentration so as to substantially eliminate an error in the calculated concentration due to turbidity of said sample.

4,684,253

APPARATUS FOR CARRYING OUT SPECTRAL ANALYSIS

Karl P. C. Lindblom, and Sonja A. Engman, both of Turku, Finland, assignors to Scanoptics Oy, Espoo, Finland

PCT No. PCT/FI83/00040, § 371 Date Jan. 3, 1984, § 102(e) Date Jan. 3, 1984, PCT Pub. No. WO83/04093, PCT Pub. Date Nov. 24, 1983
PCT Filed May 10, 1983, Ser. No. 570,930
Claims priority, application Finland, May 11, 1982, 821661
Int. Cl.[4] G01J *3/14, 3/18*
U.S. Cl. 356—333 **4 Claims**



1. An apparatus for carrying out spectral analysis comprising means for admitting radiation into the apparatus, means for recording a produced spectrum and an even number of echelle gratings which are identical in pairs and each grating of the pairs having a grating surface for dispersing incident radiation such that the wavelength dispersion due to diffraction from one echelle grating acts to increase the wavelength dispersion due to diffraction from a remaining echelle grating of each of said pairs, the gratings of each of said pairs having such an orientation that the angle of incidence of a first grating of each pair is approximately equal to the diffraction angle of a second grating a said pair, and that the diffraction angle of the first grating is approximately equal to the angle of incidence of second grating, the gratings being arranged in an air-tight container provided with means for regulating the gas pressure in the container for scanning the spectrum within a pressure range to give spectral continuity for wavelengths diffracted in higher spectral order number than a spectral order number corresponding to the longest wavelength wherein said corresponding spectral order number is m_{min}.

4,684,254

FLUID MIXER/CHARGER

Paul R. Goudy, Jr., Milwaukee, Wis., assignor to Autotrol Corporation, Milwaukee, Wis.

Filed Aug. 29, 1984, Ser. No. 645,809
Int. Cl.[4] B01F *5/06*
U.S. Cl. 366—340 **19 Claims**

1. A fluid mixer/charger, comprising

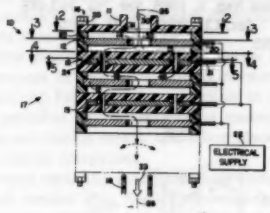
inlet means for receiving input flowing fluid,

said inlet means including directing means for directing fluid in a first directional flow path,

outlet means positioned to receive fluid flowing from said inlet means for directing such fluid along a second directional flow path different from such first directional flow path, and

charging means for applying or removing electrical charge with respect to fluid during flow by at least one of said inlet and outlet means, and one of said inlet means and

outlet means comprising a disc-like member generally impermeable to fluid flow and having a single opening therein through which fluid may flow to pass through such disc-like member, and the other of said inlet means



and outlet means comprising a disc-like member generally impermeable to fluid flow therethrough and having plural openings for dividing fluid flowing therethrough into plural streams.

4,684,255

INTERFEROMETRIC OPTICAL PATH DIFFERENCE SCANNERS AND FT SPECTROPHOTOMETERS INCORPORATING THEM

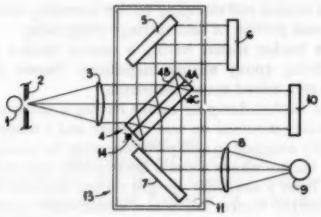
Michael A. Ford, Maidenhead, England, assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jul. 29, 1985, Ser. No. 760,013

Claims priority, application United Kingdom, Aug. 9, 1984, 8420233

Int. Cl.[4] G01J *3/45*

U.S. Cl. 356—346 **17 Claims**



1. Interferometric apparatus comprising:

(a) a rotary O.P.D. scanning assembly mounting a mirror pair formed by a beam splitter and a folding mirror, said beam splitter having a semi-reflective beam-splitting layer one face of which is the optical input surface in accurately parallel face-to-face relationship with said folding mirror and the other the output surface;

(b) two stationary reversing mirrors co-operating with said mirror pair for defining two interferometric arms, each arm receiving one of the two beams resulting from the splitting of an input beam by the beam splitter, for rotationally scanning successive O.P.D. values between the two beams up to a predetermined maximum, and for recombining the beams at said output surface so that they emerge therefrom as a single beam directed along an output path;

(c) an output mirror mounted at right angles to the output surface of said beam splitting layer, said output mirror being borne by the scanning assembly and positioned to receive the output beam; and

(d) pivotal means arranged to ensure that the scanning assembly rotates around an axis substantially coincident with the line of intersection of the prolongation planes of the semi-reflective beam-splitting layer and the face of the output mirror, respectively.

4,684,256

APPARATUS AND METHOD FOR CONTINUOUSLY MEASURING POLARIZING PROPERTY

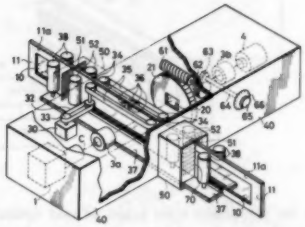
Akio Tsumura; Suguru Yamamoto, and Chiharu Miyaake, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 28, 1984, Ser. No. 687,403

Claims priority, application Japan, Dec. 30, 1983, 58-248830; Dec. 30, 1983, 58-248831; Dec. 30, 1983, 58-248832; May 1, 1984, 59-88877; May 1, 1984, 59-88878

Int. Cl.[4] G01B *4/00*

U.S. Cl. 356—367 **8 Claims**



1. An apparatus, for continuously measuring in a longitudinal direction the polarization axis of a first specimen having a planar surface and being substantially elongated in said longitudinal direction such that the polarization axis of said first specimen may vary significantly with said direction, said apparatus having an orthogonal Nicol optical system that includes a source of illumination, first and second polarizers, and a light receptor disposed along a single optical axis, the polarization axis of each of said first and second polarizers being orthogonal with respect to the other, the improvement comprising,

moveable means adapted to transport the planar surface of said first specimen between said first and second polarizers and in a direction across and perpendicular to the single optical axis, and to identify the location of the optical axis as a function of length along said planar surface,

rotatable means disposed between said first and second polarizers and adapted to hold a second specimen in a position orthogonal to the single optical axis and to rotate said specimen about an axis substantially coincident with said single optical axis, and to measure the angle of rotation as a function of the intensity of light detected by said receptor, and

means responsive to said measured angle of rotation from said rotatable means as a function of intensity measured by said receptor means, and responsive to said measured intensity of light as a function of length along the planar surface of said first specimen when conveyed by said moveable means, to determine said polarization axis as a function of length along said first specimen.

4,684,257

MEASURING INSTRUMENT

Hiroshi Hanaoka, and Sadayuki Matsumiya, both of Kawasaki, Japan, assignors to Mitutoyo Mfg., Tokyo, Japan

Filed Jan. 22, 1985, Ser. No. 693,658

Claims priority, application Japan, Feb. 2, 1984, 59-17463; Feb. 2, 1984, 59-17464

Int. Cl.[4] G01B *11/14*

U.S. Cl. 356—374 **3 Claims**

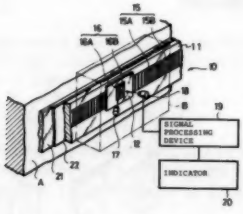
1. A measuring instrument provided therein with two or more optical type displacement detecting devices each including:

a main scale having fringes constituted by reflecting portions and non-reflecting portions, both of which are lined up alternately;

an index scale having fringes constituted by light transmitting portions and non-light transmitting portions, both of which are lined up alternately;

a light emitting element provided on the side of said index scale for irradiating said index scale and said main scale; and

a light receiving element for receiving light reflected by said main scale through said index scale to emit an electric signal corresponding to a relative displacement value between said both scales;



wherein the respective main scales of said optical type displacement detecting devices are made of a glass light transmitting material and the respective main scales are each provided with a disturbance preventing layer made of a film of a light absorbing material which absorbs a light transmitted through said non-reflecting portions of said main scales so as to not allow the light to be reflected to said index scales; and

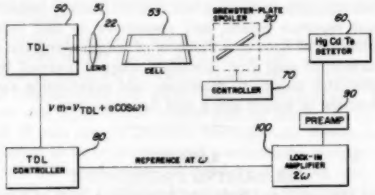
wherein a glass plate is disposed on the side of said main scale opposite to said index scale and said disturbance preventing layer is provided on the side surface of said glass plate facing said main scale.

4,684,258

METHOD AND APPARATUS FOR ENHANCING LASER ABSORPTION SENSITIVITY

Christopher R. Webster, Pasadena, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 31, 1985, Ser. No. 760,790
Int. Cl.[4] G01N *21/17*
U.S. Cl. 356—409 **19 Claims**



9. Apparatus for reducing interference fringes which are present in a passive cavity defined by partially-transmissible optical surfaces in a tunable laser absorption spectrometer, said apparatus comprising:

a transmissive plate means adapted for oscillation and located in the laser's optical beam; and

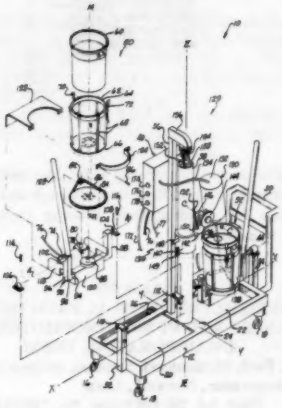
means for oscillating said plate means over an angle selected to cancel the interference fringes.

4,684,259

EPOXY MIXING AND DISPENSING APPARATUS

Steven J. Rice, Lakewood; Gilbert M. Thompson, Littleton; Michael W. Dolph, Lakewood, and Daniel D. Montoya, Brighton, all of Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Aug. 5, 1985, Ser. No. 762,495
Int. Cl.[4] B01F *9/10, 15/02*
U.S. Cl. 366—185 **7 Claims**



1. An epoxy mixing and dispensing apparatus for continuously mixing epoxy for application to a surface to be coated therewith comprising:

(a) a movable carriage;

(b) a first mixing and dumping bucket assembly mounted at a first end portion of said carriage comprising:

(i) first bucket means having a central bucket axis for receiving epoxy mixing ingredients therein and discharging mixed epoxy therefrom;

(ii) first bucket dumping means having a pivot assembly pivotally mounted on said carriage and a dump handle fixedly attached to said pivot assembly for pivoting said first bucket means about a horizontally disposed dump axis from a normally upright mixing position wherein the central bucket axis is in a substantially vertical orientation to a dumped position wherein the central bucket axis is in a generally horizontal orientation, said bucket means being rotatably mounted on said pivot assembly;

(iii) first power driven bucket rotation means comprising a first electrical motor means operatively linked to said first bucket means for rotating said first bucket means about said central bucket axis for facilitating the mixing of said epoxy ingredients, with said motor means fixedly attached to said pivot assembly whereby said motor means pivots with said first bucket means during pivotal movement of said first bucket dumping means;

(c) a second mixing and dumping assembly mounted at a second end of said carriage comprising:

(i) second bucket means having a central bucket axis for receiving epoxy mixing ingredients therein and discharging mixed epoxy therefrom;

(ii) second bucket dumping means for pivoting said second bucket means about a horizontally disposed dump axis from a normally upright mixing position wherein the central bucket axis is in a substantially vertical orientation to a dumped position wherein the central bucket axis is in a generally horizontal orientation;

(iii) second power driven bucket rotation means for rotating said second bucket means about said central bucket

axis for facilitating the mixing of said expoxy ingredients;

(d) an epoxy mixing assembly comprising:

(i) power driven epoxy mixer means selectively insertable into and removable from said first and second bucket means and rotatable in a direction opposite the direction of rotation of said bucket means for mixing epoxy ingredients in said bucket means;

(ii) mixer placement and support means for facilitating movement of said mixer means between said bucket means and for supporting said mixer in various operating positions within said bucket means and removed from said bucket means, said mixer placement and support means comprising:

a central vertically extending guide post, having a central vertical axis, fixedly mounted on said carraige between said first and second bucket assemblies;

mixer sleeve means closely slidingly mounted on said post, said sleeve means being slidingly vertically displaceable on said guide post and being rotatably displaceable relative the central vertical axis of said guide post; and

mixer adjustable pivotal attachment means for adjustably attaching said mixer means to said mixer sleeve means and for allowing pivotal movement of said mixer means relative said sleeve means about a horizontally disposed axis; and

(e) control means for independently controlling said first and second power driven bucket rotation means and said power driven epoxy mixer means.

4,684,260

ASTRONOMICAL CLOCK

Horst Jäckle, Kappel, Fed. Rep. of Germany, assignor to Johann Jackle Metallwarenfabrik, GmbH & Co., Schwenningen, Fed. Rep. of Germany

Filed Feb. 12, 1986, Ser. No. 828,873

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1985, 3505222

Int. Cl.[4] H04B *19/26*

U.S. Cl. 368—16 **13 Claims**

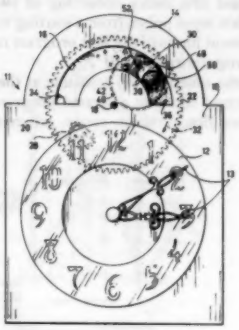
1. A clock for representing moon phases at night, said clock comprising:

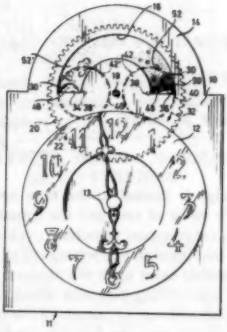
a window in the face of the clock;

a rotatable moon disc having a circular hole for defining an image representing the moon, said moon disc being parallel to the face of the clock and visible through said window in the face of the clock, said circular hold being visible through said window in the face of the clock;

a rotatable moon phase disc visible through said window and said circular hole, said moon phase disc attached to the backside of said moon disc on an axis offset from the axis of the rotation of said moon disc and having alternating light background areas and dark circular areas, said light areas corresponding to the brightness of the illuminated moon and said dark circular areas corresponding to the shadowed moon, portions of said light areas and said dark areas being successively visible through said circular hole and said window, said visible portions corresponding to moon phases;

means for rotating said moon disc with respect to said window; and





means for rotating said moon phase disc with respect to said moon disc.

4,684,261

METHOD FOR ENTERING A SWITCHING PROGRAM INTO AN ELECTRONIC TIMER AND ARRANGEMENT FOR IMPLEMENTING THE METHOD

Werner Arnold, Nuremberg; Hans Grasser, Eckental; Tilmann Kruger, Neunkirchen, and Alfred Meisner, Nuremberg, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Fed. Rep. of Germany

Filed May 30, 1984, Ser. No. 615,133

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1983, 3321223

Int. Cl.[4] G04F *8/00*

U.S. Cl. 368—107 **6 Claims**

1. In a method for the entry of a switching program into an electronic timer, the switching program consisting of at least one switching cycle within a predetermined time range, such as within 23 hours 59 minutes, wherein the switching cycle is defined in time through any two of three entities consisting of switching cycle-start, switching cycle-period and switching cycle-end, and wherein the entry is effected serially in the form of sequential input pulses, information with respect to the setting direction being associated with said pulses, said pulses being counted into forward-backward counter means; the improvement comprising:

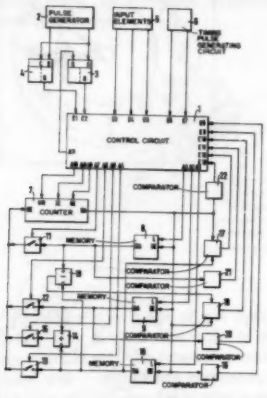
defining a switching cycle by the entities of switching cycle-start and switching cycle-period, entering the switching cycle-start as the first entity and entering the switching cycle-period as the second entity;

limiting the entry of said first entity for defining of the switching cycle to a time interval between the actual time and the end of a pregiven first program range;

setting said first entity consisting of switching cycle-start with first input pulses from a starting value close to one of the present limits of the first program range but within the first program range; and

limiting the time interval available at the input for defining the second entity to a second program range within the pregiven first program range, wherein said second program range is limited to the time interval between the boundary value of zero and the actual time plus the first program range minus switching cycle-start;

rendering said input pulse inoperative or selectively erasing the applicable entry upon the input of an input pulse with an associated setting direction which would set the value of the applicable entity outside of the first program range, and wherein at least the first input pulse for the definition of an entity of a switching cycle is operative only upon a pregiven setting direction being associated with said input pulse.



4,684,262

ELECTRONIC TIMEPIECE WITH ANALOG DISPLAY COMPRISING A SECONDS INDICATOR MEMBER

Pierre-André Meister, Bienne, Switzerland, assignor to Eta S.A. Fabriques d'Ebauches, Granges, Switzerland

Filed Sep. 9, 1986, Ser. No. 905,224

Claims priority, application Switzerland, Sep. 11, 1985, 920/85

Int. Cl.[4] G04F *5/00*; H02K *29/04*

U.S. Cl. 368—157 **9 Claims**

1. An electronic timepiece with analog display comprising an oscillator;

a frequency divider connected to said oscillator;

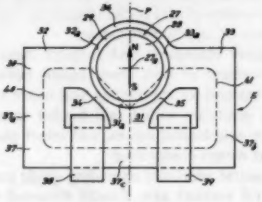
a first indicator member for displaying the seconds and a second indicator member for displaying other time information;

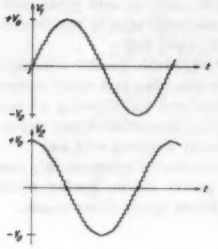
a first motor comprising a rotor with a permanent magnet carried by a shaft drivingly coupled to the first indicator member and at least two coils;

a first control circuit connected to the frequency divider to control the first motor, which is operative to apply continuously to said coils variable voltages whereby the rotor of this first motor is subjected to a magnetic field rotating such that the first indicator member moves forward by at least five jumps per second, so long as the timepiece is in a normal functioning mode;

a second motor which functions step-by-step in response to voltage drive pulses so as to drive the second indicator member;

a second control circuit also connected to the frequency divider to produce the said voltage drive pulses and apply them to the second motor; and





a correction device for changing the timepiece from said normal functioning mode to a correction mode and vice versa and for modifying at least the time information displayed by the second indicator member when the timepiece is in the correction mode;

4,684,263

MAGNETIC BRAKE FOR TIMEPIECE

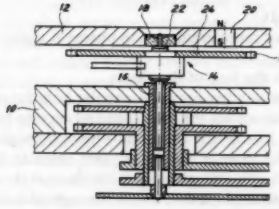
Georges Etienne, Peseux, Switzerland, assignor to ETA S.A. Fabriques d'Ebauches, Granges, Switzerland

Filed Sep. 8, 1986, Ser. No. 904,588

Claims priority, application Switzerland, Oct. 2, 1985, 04248/85

Int. Cl.[4] G04B *19/02, 29/00*

U.S. Cl. 368—220 **8 Claims**



1. A magnetic brake for the wheel train of a timepiece including a seconds wheel having teeth on the periphery thereof, said brake comprising a fixed magnet and said seconds wheel, said wheel being separated from said magnet by a gap and fashioned from magnetic material having a coercive field of between 10 Oe and 100 Oe, said magnet being located in the vicinity of the wheel periphery and radially offset toward the wheel axis with respect to the teeth thereon, and the distance across said gap and the magnetic properties of said magnet and

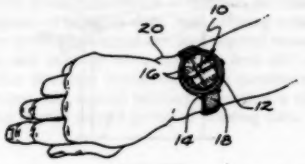
the magnetic properties of said wheel being such that displacement of said wheel about its axis provides braking of said wheel train.

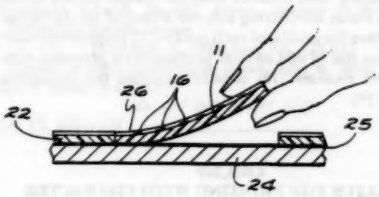
4,684,264

PROTECTIVE OVERLAY FOR WATCH CRYSTAL

Steven H. Paperno, 4558 Cherry Valley Cir., and Lisa R. Monica, 4226 Danwood Dr., both of Westlake Village, Calif. 91362

Filed Dec. 20, 1985, Ser. No. 811,406
Int. Cl.[4] G04B *37/00*; B32B *3/00*
U.S. Cl. 368—283 **16 Claims**





1. A protective overlay for mounting onto a watch crystal to prevent scratching or other damage to the watch crystal, said overlay comprising:

a relatively thin and lightweight disk of a transparent high static vinyl sheet material, said disk having a front side and a rear side, said rear side being adapted for direct stick-on static attachment to the watch crystal;

decorative ornamentation applied to the front side of said disk, said ornamentation being of selected color and pattern and permitting unobstructed viewing through a substantial portion of said disk; and

a protective transparent surface layer applied to the front side of said disk over said ornamentation.

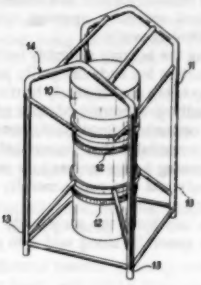
4,684,265

HEAT FLUX METER FOR CHECKING CALORIGENIC MATERIALS WITHIN A CONTAINER

Paul Bourrelly; Henri Patin; Robert Schoepp, all of Marseille, and Charles Sanson, Chatenay-Ilaleb, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 16, 1984, Ser. No. 600,456
Claims priority, application France, Apr. 19, 1983, 83 06366
Int. Cl.[4] G01N *25/20*; G01K *17/08*
U.S. Cl. 374—43 **4 Claims**

1. A device for checking a quantity of calorigenic materials, comprising: a container containing said quantity of calorigenic materials, a transportation cage within which said container is centered, said transportation cage being made of a good heat conducting material, a heat flow probe for sensing heat flow generated by said calorigenic materials, said probe comprising at least a first set of a plurality of first thermistors connected in series and located on an outer surface of said container, said first thermistors being in thermal contact with said container and thermally insulated from ambient air for sensing a mean temperature of the container, and at least a second set of a plurality of second thermistors connected in series and located on said transportation cage and in thermal contact with the ambient air for sensing a mean temperature of the ambient air, whereby a difference between said mean temperatures sensed



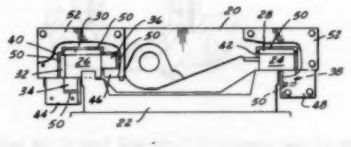
by said sets indicates the heat flow from said container and thereby the quantity of calorigenic materials in said container.

4,684,266

SLIDE AND WAY ASSEMBLY AND METHOD OF MAKING SAME

Robert A. Furmanek, Maple Heights; Jyoti P. Mukherjee, North Royalton, and Pasquale J. Lanese, Mayfield Heights, all of Ohio, assignors to The Warner & Swasey Company, Cleveland, Ohio

Filed Oct. 30, 1986, Ser. No. 925,014
Int. Cl.[4] F16C *29/02*
U.S. Cl. 384—37 **7 Claims**



1. In combination with a slide and way assembly of the type having a slide (**20**) supported on ways (**24, 26**) and bearing components (**28–38**) for supporting said slide (**20**) on said ways (**24, 26**) and engaging said ways, the improvement comprising;

means (**50**) for releasably mounting said bearing components (**28–38**) whereby said bearing components (**28–38**) are removable from the assembly without removing said slide (**20**) from said ways (**24, 26**).

4,684,267

SPLIT BEARING ASSEMBLIES

Mohamed A. Fetouh, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 627,028, Jul. 2, 1984, Pat. No. 4,569,109.
This application Sep. 3, 1985, Ser. No. 771,662
Int. Cl.[4] F16C *9/02, 9/04, 33/14*
U.S. Cl. 384—294 **8 Claims**

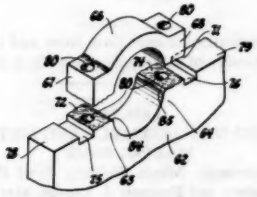
1. A split bearing assemby comprising a rotatable shaft support having a main body with a plurality of saddle-like transverse webs and an integrally formed and subsequently separated bearing cap attached to each of said webs, wherein said caps and webs define a plurality of longitudinally spaced shaft supporting bearing openings, said caps engage their attached webs along mating fractured ends of associated legs of the caps and webs, and said shaft support further includes longitudinal notches in said bearing openings, said notches forming inner edges of said mating fractured ends of the associated legs.

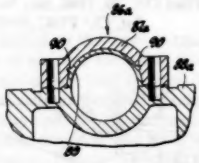
4. A split bearing assembly having a saddle-like main body

with first and second legs and an integrally formed and subsequently separated removable saddle-like bearing cap attached to the main body with first and second legs having fractured ends respectively secured in end-to-end engagement with mating fractured ends of the first and second legs of said body to define a journal receiving opening, said assembly being formed by a method comprising,

initially forming the bearing assembly body and cap integral with their-mating leg ends integrally joined, said integral body and cap being in a relatively brittle condition, at least along generally predetermined split planes defining the leg ends on opposite sides of said opening, said body and cap having essentially their assembled final dimensions, with said opening being centered on an axis lying within said main body and said cap, generally between said split planes,

separating the cap from the main body by fracturing the integral legs generally along said split planes on opposite





sides of said opening to form said legs of the saddle-like cap and body, said first and second legs of the cap and body respectively comprising first and second pairs mateable along said split planes, wherein the fracturing step is accomplished by causing tension across the split plane of one of said mateable pairs of legs to fracture and separate the ends of the legs of said one pair at their respective split plane while limiting relative movement of the cap and body to avoid substantial bending or complete fracture of the other mateable pair of legs,

clamping the separated pair of legs in substantially their mated position and causing tension across the split plane of the other mateable pair of legs to fracture and separate their ends at their split plane without substantial bending,

thereby avoiding bending of the legs at the split planes and yielding deformation at the leg edges to thus provide the capability of mating reassembly without substantial dimensional change.

4,684,268

ROLLER BEARING CAGE

Anders Sahlgren, Mölndal; Rolf Gustafsson, Hindås; Bo Göransson, Göteborg, and Yngve Sundqvist, Partille, all of Sweden, assignors to Aktiebolaget SKF, Goteborg, Sweden

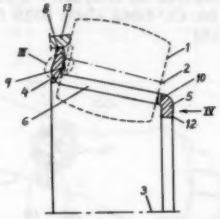
Filed Oct. 9, 1986, Ser. No. 917,200

Claims priority, application Sweden, Dec. 10, 1985, 8505822

Int. Cl.[4] F16C *33/54*

U.S. Cl. 384—574 **5 Claims**

1. A cage for a row of rollers (1) in a roller bearing in which the axes (2) of the rollers define a cone, which cage comprises two closed annular portions (4, 5) and a number of bars (6) extending between said portions, the bars defining roller pockets (7), characterized in that the cage bars (6) extend substantially parallel to the axes of adjacent rollers and are situated between the bearing axis (3) and the roller axes (2), that a flange (8) is provided at one end of the cage in connection to one of said annular portions (4) and extending radially outwards, the flange having a side surface intended for contacting the adjacent end surfaces of the rollers situated in the cage, that



a number of protrusions (9) extending towards the pockets of the cage and having surfaces facing the pockets and successively increasing their distance from the flange surface in the direction towards the bearing axis are arranged on the flange (8) so as to face the middle of each pocket (7), respectively, and that the other one of said annular portions (5) is provided with a number of recesses (10) situated opposite the respective protrusions (9).

4,684,269

APPARATUS FOR PRINTING WITH CHARACTER FONTS AND DOT-MATRIX PRINTING IN THE SAME LINE

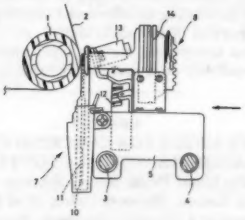
Yasuhiro Miki, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Aug. 13, 1985, Ser. No. 765,213

Claims priority, application Japan, Aug. 21, 1984, 59-174720

Int. Cl.[4] B41J *3/12, 3/54*

U.S. Cl. 400—82 **12 Claims**



1. A composite printing apparatus including a first printing assembly which has character fonts, and a second printing assembly for printing characters with a matrix of dots, comprising:

a carriage which carries said first and second printing assemblies and which reciprocates along a line of printing;

a carriage drive motor for reciprocating said carriage along said line of printing;

separator means comprising a memory for storing a series of input printing data corresponding to a plurality of successive characters which constitute at least one line of characters, said separator means being operable for classifying said series of input printing data into a first group of printing data for a first printing operation with the character fonts of said first printing assembly, and a second group of

printing data for a second printing operation with the matrix of dots of said second printing assembly;

printing control means for activating one of said first and second printing assemblies according to a corresponding one of said first and second groups of printing data, and subsequently activating the other printing assembly according to the other one of said first and second groups of printing data, and for thereby effecting a mixed type and dot-matrix printing in the same line of printing which comprises said line of characters;

said printing control means including first carriage control means for activating said carriage drive motor to feed said carriage in one of opposite directions along said line of printing in increments of a one-character distance when said first printing operation is effected according to said first group of printing data, said printing control means further including second carriage control means for activating said carriage drive motor to feed said carriage in the other direction continuously at a predetermined feed rate when said second printing operation is effected according to said second group of printing data.

4,684,270

PRINT ELEMENT, PRINTER AND METHOD OF PRINTING

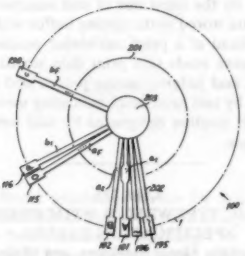
Yoshiyuki Sakurai, Shiojiri, Japan, assignor to Seiko Epson Kabushiki Kaisha, Japan

Filed Apr. 5, 1985, Ser. No. 720,332

Claims priority, application Japan, Apr. 6, 1984, 59-68649; Apr. 6, 1984, 59-68650

Int. Cl.[4] B41J *1/30, 3/12*

U.S. Cl. 400—121 **31 Claims**



1. A serial matrix font type printer for printing dot matrix type graphics displays in response to print data, comprising: a frame; a platen mounted within the frame; a carriage slidably mounted on the frame to allow lateral reciprocating motion with respect to the frame along the platen; and serial matrix printing head means mounted on the carriage, including mounting means for coupling the printing head means to the carriage; carrier means coupled to the mounting means for supporting type elements; print element means operatively coupled to the carrier means for printing at least graphics images formed of dot patterns of a designated length, said print element means including at least two shorter dot pattern segment series, the total length of said shorter dot pattern segment series being equal to the designated length, each of said shorter dot pattern segment series have a series of type elements on the carrier means corresponding to each printable dot pattern combination of the corresponding shorter dot pattern segment series; and driving means for dividing the print data of the designated length into at least two shorter dot patterns segment series and moving said carriage to a desired position along said platen and selecting a desired type element to be in the printing position in opposition to said platen and impacting such type element against said platen and repeating selection of type elements and impaction of such type elements for each type element to be printed at the desired position; the type elements being positioned on the carrier means to avoid overlap when type elements corresponding to different shorter dot pattern segment series are printed at a single desired position; said driving means moving said carriage from said desired position only after each of the type elements to be printed at said desired position are printed; whereby dot matrix type graphics can be printed using a serial matrix font type printer.

4,684,271

THERMAL TRANSFER RIBBON INCLUDING AN AMORPHOUS POLYMER

Russel E. Wellman, Southbury, and Phyllis A. Cuming, Naugatuck, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Jan. 15, 1986, Ser. No. 818,934

Int. Cl.[4] B41J *31/00*

U.S. Cl. 400—241.1 **12 Claims**

1. A ribbon for thermal transfer printing comprising: a substrate and an inking layer, said inking layer comprising a low molecular weight polymer, a colorant, and an amorphous polymer, said substrate and said inking layer having a tacky interface and said inking layer having a substantially non-tacky outer surface.

4,684,272

SPOOL FOR CORRECTION TAPE ASSEMBLY

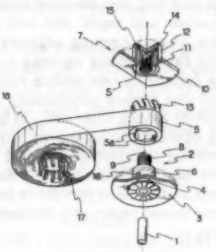
Hiroaki Watanabe, Yokohama, Japan, assignor to Fuji Kagakushi Kogyo Co., Ltd., Osaka, Japan

Filed Dec. 19, 1985, Ser. No. 811,157

Claims priority, application Japan, Dec. 19, 1984, 59-193634[U]

Int. Cl.[4] B65H *75/00, 75/18*

U.S. Cl. 400—242 **6 Claims**



1. A typewriter spool designed to receive and releasably secure a correction tape-winding core for purposes of incrementally winding a length of correction tape on the core as portions of the tape are used for correction purposes, said spool comprising:

a spool shaft designed to receive a correction tape-winding core axially slideable thereon and relatively rotatable therewith, said shaft having a threaded upper portion which extends above the width of the correction tape being wound on said core, said upper portion having a head surface, and

a cap having a threaded bore having a seat portion, said cap being threadably-engageable with the threaded upper portion of said spool shaft to secure a said correction tape core on said spool shaft against axial sliding movement,

the head surface of said spool shaft and the seat portion of said cap bore being engaged when said cap is screwed onto said spool shaft, and said head surface and seat portion comprising materials having different coefficients of elasticity relative to each other so that one said material is a softer material and the other said material is a harder material relative thereto, the harder material thereof comprising a transverse, elongate projection which presses

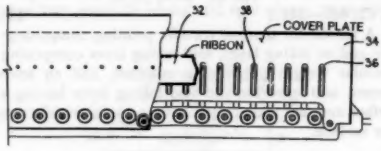
into the softer material thereof when said cap is tightened onto said spool shaft, causing relative compression and resistance to loosening of the cap from the shaft during use.

4,684,273

RIBBON SHIELD FOR IMPACT PRINTER AND METHOD FOR CONTROLLING INK FLOW THEREIN

John W. Huffman; Brian J. Picht, both of Boise, and Ben B. Tyson, Eagle, all of Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 30, 1985, Ser. No. 740,469
Int. Cl.[4] B41J *33/32*
U.S. Cl. 400—247 **6 Claims**



2. In an impact printer arrangement including a platen against which a stylus hammer drives an ink containing ribbon to form a character on a sheet of paper, and including a ribbon shield positioned between the ribbon and paper to minimize unintentional contact between said ribbon and paper, the improvement comprising: a metal shield having an opening of stepped contour therein, said opening surrounding said stylus hammer and having first and second diameters, with said first diameter being smaller than said second diameter by a predetermined amount, and said first diameter defining a portion of said opening adjacent said paper and said second diameter defining a portion of said opening adjacent said ribbon and forming with said first diameter opening a reservoir cavity, said cavity being defined by one surface substantially parallel to said paper and one surface substantially perpendicular to said paper, said cavity having inner surfaces facing toward said ribbon and being operative to scrape ink from said ribbon by edge friction between said ribbon and said second diameter opening, whereby said reservoir cavity tends to accumulate residual ink therein and tends to prevent or impede the flow of residual ink therein to said paper, and eliminate or minimize ink smudging thereon.

4,684,274

PRINT HEAD SHIFTING APPARATUS FOR ELECTRONIC TYPEWRITER OR THE LIKE

Hideo Ueno, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Continuation of Ser. No. 586,822, Mar. 6, 1984, abandoned. This application Jan. 13, 1986, Ser. No. 818,061
Claims priority, application Japan, Mar. 18, 1983, 58-46569
Int. Cl.[4] B41J *19/71, 19/50*
U.S. Cl. 400—320 **4 Claims**

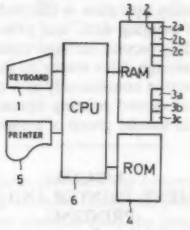
1. A print head shifting apparatus for a typewriter a printer, or the like, said apparatus driving a carriage with a print head movably supported thereon along a printing line of paper, and executing operations for print character data, print head shift data and paper feed data obtained from an input means; said apparatus comprising

a print buffer for temporarily storing print data designating characters entered from said input means, and for temporarily storing a plurality of successive head shift data designating shifting of said print head and entered sequentially from said input means, a succeeding head shift data being entered before stopping of the head at a position designated by a prior head shift data;

a reading means for sequentially and continuously reading the print data and the shift data stored in said print buffer, comprising a print point indicating means for designating a digit position under processing of said print buffer, and a write point indicating means for designating a digit position of final one of said successive head shift data stored in said print buffer;

a calculating means responsive to successive head shift data read by said reading means for sequentially calculating distance data to shift said print head along said print line corresponding to said successive head shift data;

a setting buffer for storing the distance data calculated by said calculating means;



a judging means for judging whether said digit position designated by said print point indicating means to be equal or not to said digit position designated by said write point indicating means; and

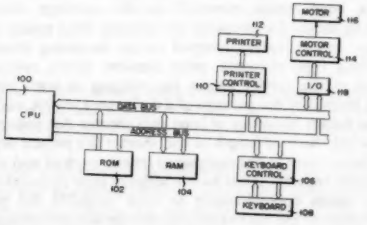
a control means for shifting said print head to a position designated by the latest one of said successive calculated distance data stored in the setting buffer without stopping said print head at a prior calculated position when said reading means reads said print data stored in said print buffer and said judging means judges said digit position designated by said print point indicating means to be equal to said digit position designated by said write point indicating means.

4,684,275

ELECTRONIC TYPEWRITER WITH PRESETTABLE SPECIFICATION TABLES

Tsuyoshi Matsushita; Motoi Maekawa, and Makoto Takahashi, all of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Jun. 24, 1983, Ser. No. 508,065
Claims priority, application Japan, Feb. 22, 1983, 58-28224
Int. Cl.[4] B41J *5/08*
U.S. Cl. 400—479 **6 Claims**



1. An electronic typewriter, comprising:

a printer circuit;

memory means for storing a plurality of specification tables, each having a plurality of key data and respectively corresponding to a plurality of key arrangements;

a keyboard circuit including a plurality of key operation scan lines, a plurality of return lines, an additional, key

specification scan line, at least one selection diode which is connected between said additional scan line and a corresponding one of said plurality of return lines to select one of said plurality of specification tables, and a plurality of character keys which are arranged in accordance with one of said plurality of specification tables and each of which includes a key switch connected between one of said plurality of key operation scan lines and a corresponding one of said plurality of return lines; and

a data processing circuit, coupled to said keyboard circuit, printer circuit and memory means, for detecting said selected specification table in accordance with a scan signal on one of said return lines which is connected to said at least one selection diode, and to read out the corresponding key data from said selected specification table in accordance with the operation of said character keys for driving said printer circuit in accordance with said key data read out.

4,684,276

INDIVIDUAL SHEET FEEDER DEVICE FOR PRINTER

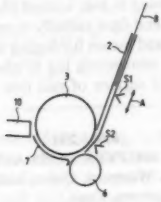
Urs Frei, Bachenbülach; Harald Richter, Zürich, and Donald Stait, Steinmaur, all of Switzerland, assignors to Contraves AG, Zürich, Switzerland

Filed Sep. 26, 1985, Ser. No. 780,529

Claims priority, application Switzerland, Sep. 28, 1984, 4663/84

Int. Cl.⁴ B41J *13/26*

U.S. Cl. 400—630 **3 Claims**



1. A sheet feeder accessory device for feeding manually inserted pre-printed forms to a print point in a printer having a predetermined feed direction, comprising:

a sheet feed guide structure for guiding a manually-inserted pre-printed form to be printed into the printer;

mounting means for removably attaching said sheet feed guide structure to the printer;

sensing means comprising at least two optical position sensors arranged in said sheet feed guide structure in mutually differing spaced relationships prior to the print point in the printer in said predetermined feed direction for selectively performing a sequence of detection of at least a desired one of the features including:

a leading edge of the pre-printed form to be printed;

a trailing edge of the pre-printed form to be printed; and

at least one registration mark contained within the pre-printed form to be printed;

said at least two optical position sensors comprising means for generating at least two detection signals in response to said sequence of detection of said at least one desired feature;

a control processor operatively connected to each of said at least two optical position sensors for receiving each said at least one detection signal;

said control processor comprising means for performing an evaluation of each received detection signal in relation to at least one predeterminate print field of the pre-printed form to be printed;

said control processor comprising means for generating in response to said performed evaluation at least one first control signal for transmission to the printer for causing the printer to automatically advance the pre-printed form to be printed by a predeterminate amount corresponding to a location of said at least one predeterminate print field; and

said control processor comprising means for generating in response to said performed evaluation at least one second control signal for transmission to the printer for causing the printer to accept data for printing.

4,684,277

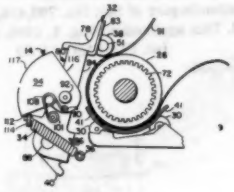
APPARATUS FOR DELAYING PRINTER BAIL CLOSING

Carl W. Edstrom, Canoga Park; Daniel E. Fedele, Simi, and Martin Lazar, Canoga Park, all of Calif., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 210,953, Nov. 28, 1980, abandoned. This application Jan. 3, 1983, Ser. No. 454,947

Int. Cl.⁴ B41J *13/20*

U.S. Cl. 400—639.1 **6 Claims**



1. A printing apparatus comprising:

a rotatable platen assembly comprising a platen roller and a platen gear;

a paper bail pivotally mounted for movement through an arc between a closed position in rolling contact with said platen roller and an open position spaced from said platen roller; and

a rotatable sector cam mounted on said paper bail, said cam having a rotational axis parallel with said platen roller, said sector cam in a first rotational position preventing movement of said paper bail to said closed position, said sector cam rotating by frictional contact with said platen gear to a second rotational position wherein said paper bail moves to said closed position.

4,684,278

JOINT FOR USE IN COLLAPSIBLE CHAIRS AND THE LIKE

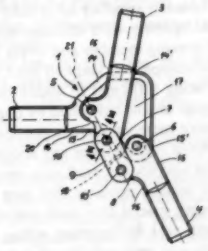
Jörg Rauschenberger, Gartenstrasse 8, D-7144 Asperg, Fed. Rep. of Germany

Filed Mar. 27, 1986, Ser. No. 844,801

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1985, 3511238

Int. Cl.⁴ F16C *11/00*

U.S. Cl. 403—84 **12 Claims**



1. A joint, particularly for use in a collapsible chair, compris-

ing first and second levers; a main component including an end portion constituting a bearing element; first and second pivot members respectively connecting said first and second levers to said bearing element; a link having spaced-apart first and second portions; and third and fourth pivot members respectively connecting said first and second portions to said first and second levers in such a manner that said first and second levers are coupled to one another for joint movement, said pivot members being parallel to each other, and said levers being pivotable with reference to said component to and from predetermined positions in which the axes of said third and fourth pivot members and the axis of one of said first and second pivot members are disposed in or close to a common plane.

4,684,279

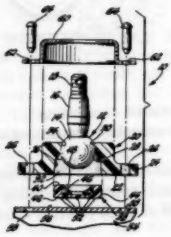
BALL JOINT

Frederick C. Weber, Englewood, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 790,434, Oct. 23, 1985, abandoned. This application Aug. 1, 1986, Ser. No. 891,625

Int. Cl.⁴ F16C *11/00*

U.S. Cl. 403—136 **3 Claims**



1. A ball joint, comprising;

a stud having a head,

a socket having a cavity with an opening sized so as to admit said stud head, said cavity further including a closure surface adjacent to and completely around said opening that converges in a direction into said cavity,

a cap having opposed inner and outer sides and a peripheral closure surface extending between said inner and outer sides that substantially conforms to said cavity closure surface, whereby said cap may be inserted inner side first into said opening after said stud has been inserted into said cavity to thereby engage said cap and cavity closure surfaces to seal said opening,

at least one deformable protuberance extending a predetermined distance from said cap outer side,

a housing member having a surface portion, and,

cover means having a surface portion and adapted to fix said socket to said housing member after said cap has been inserted into said opening with said cap outer side facing one of said said housing member and cover means surface portions, thereby completing said ball joint, said predetermined distance being sufficient to assure that said protuberance will engage and be deformed by one of said cover means and housing member surface portions as said ball joint is so completed regardless of any accumulated tolerance variations in said socket, stud, cap, cover means and housing member surface portions that may result in said cap outer side being spaced from said surface portions by a varying amount, said deformation acting to force said cap in a direction into said opening, thereby forcing said converging cavity closure surface and cap closure surface into tighter engagement to assure that said opening remains sealed by said cap.

4,684,280

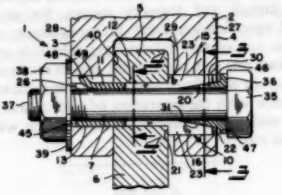
CLEVIS CONNECTION

William Dirkin, and Gary Feldt, both of Kalamazoo, Mich., assignors to Pneumo Abex Corporation, Boston, Mass.

Filed Apr. 14, 1986, Ser. No. 851,156

Int. Cl.⁴ F16C *11/00*

U.S. Cl. 403—157 **20 Claims**



1. A clevis connection comprising a clevis member including first and second clevis arms, a connecting member having a connecting lug received between said clevis arms, a bolt extending through respective first and second openings in said first and second clevis arms and through a third opening in said connecting lug, a bushing surrounding said bolt, said bushing having a sleeve portion extending through said third opening in said connecting lug and into said first opening in said first clevis arm, said bushing having an enlarged shoulder extending into said second opening in said second clevis arm, said shoulder having an inner end face radially overlapping one side of said connecting lug, and means for urging said shoulder against said one side of said connecting lug to clamp said connecting lug against an interior surface of said first clevis arm.

4,684,281

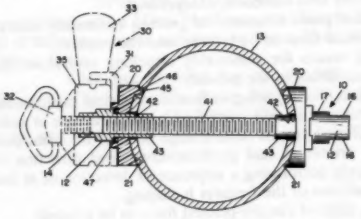
BICYCLE SHIFTER BOSS ASSEMBLY

Thomas C. Patterson, Westport, Conn., assignor to Cannondale Corporation, Georgetown, Conn.

Filed Aug. 26, 1985, Ser. No. 769,577

Int. Cl.⁴ F16B *7/08, 39/10*

U.S. Cl. 403—197 **4 Claims**



1. A shifter boss assembly for mounting at least one shift lever assembly on a tube of a bicycle frame comprising a member having threads at each end, the member being adapted to extend substantially diametrically at least partway through the tube with the threaded ends disposed adjacent openings in the tube, a mounting base adjacent one tube opening including an inner face having a shape complementary to and adapted to engage the outside surface of the tube adjacent the opening, an opening therethrough for alignment with the opening in the tube and for reception of the threaded rod end, base rotation inhibiting means formed on the inner face for inhibiting rotation of the base with respect to the tube, a shifter stud having a threaded portion at one end threaded onto the threads on one end of the member, a shoulder engaging the mounting base to clamp the mounting base against the tube, and an inward projection fitting through the opening in the base, the internally

threaded hole of the stud opening inwardly to receive the threaded rod end and the inward projection on the stud terminating outwardly at the shoulder, an internally threaded opening at the other end of the stud opening outwardly away from the tube and located to receive an adjusting bolt of the shift lever assembly, stud rotation inhibiting means interacting between the base and the stud including a locking plate fitting over the stud in a keyed relation to a surface thereof for preventing relative rotation between the stud and the plate, interfitting keying means on the base and the plate for preventing relative rotation between the base and the plate, whereby the plate, base and stud are interlocked against relative rotational movement, and means associated with the threads on the other end of the member and with the tube for securing said other end of the member to the tube.

4,684,282

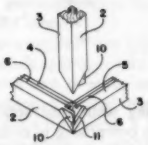
STRUCTURAL ELEMENT FOR THREE DIMENSIONAL OBJECTS, E.G. FURNITURE

Robert J. A. B. Lever, Veerstraat 2, Schoonhoven, Netherlands

Filed Nov. 20, 1984, Ser. No. 673,427

Int. Cl.[4] F16D *1/00*

U.S. Cl. 403—219 **5 Claims**



1. A structural element for erecting, with one or more similarly formed elements, three dimensional objects comprising an elongated member having an end of rectangular section being joined along said end angularly to another elongated member formed similarly at at least one end, said joining ends being each formed with a pair of angularly disposed chamfers each at a predetermined angle with the longitudinal axis, and having a tenon projection and a corresponding mortise, the tenon and mortise being disposed relative to each other each in a respective one of said chamfers, at right angles to each other, such that on joining said elements the tenons of one element fit within the mortise of the other element and the chamfered ends abut each other.

4,684,283

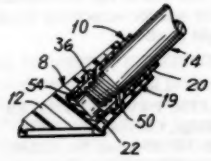
HANDLE SOCKET ADAPTER

John C. Lewis, Jr., Salisbury, Vt., assignor to The Drackett Company, Cincinnati, Ohio

Filed Jun. 23, 1986, Ser. No. 877,573

Int. Cl.[4] F16B *9/00*; F16L *41/00*

U.S. Cl. 403—299 **6 Claims**



1. A socket adapter for threadably receiving a handle having a body and a thread end and a substantially transverse annular surface interposed between said threaded end and said body, said socket adapter comprising:

a tubular body having an internal surface with a predetermined inside diameter;

an annular thread base axially aligned with said internal surface and interposed between the ends of said tubular body, said thread base having a substantially transverse annular ledge adapted to be contiguous to at least a portion of said annular surface when said handle is threadably engaged within said socket adapter; and

a single, non-deformable thread secured to said thread base, said thread beginning a predetermined distance away from said annular ledge, subtending an arc of less than 360° and adapted to engage said threaded end of said handle.

4,684,284

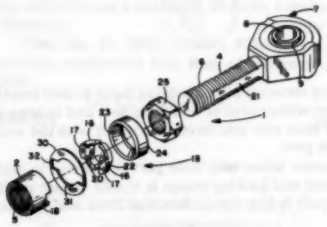
ANTI-ROTATION LOCK ASSEMBLY

Charles D. Bradley, Jr., Gobles, Mich., assignor to Pneumo Abex Corporation, Boston, Mass.

Filed Jun. 12, 1986, Ser. No. 873,696

Int. Cl.[4] F16B *29/00, 39/36*

U.S. Cl. 403—320 **15 Claims**



1. An anti-rotation lock assembly between an internally threaded female member and an externally threaded male member in threaded engagement with each other comprising lock means movable between a first position permitting relative rotation between said members for adjustment of said male member axially in or out relative to said female member and a second position locking said members against relative rotation, force applying means for releasably moving said lock means from said first position to said second position, and retaining means for retaining said lock means on said male member when said force applying means is released, said retaining means comprising a retaining ring surrounding said male member, said retaining ring having a central opening of a size somewhat larger than the outer diameter of a threaded end of said male member, and a radial slot extending radially outwardly from said central opening, said lock means having a portion thereof mounted in said radial slot for radial movement of said lock means toward and away from the exterior surface of said threaded end.

4,684,285

RELEASABLE CONNECTOR APPARATUS

Neil Cable, Leiden, Netherlands, assignor to Agence Spatiale Europeenne, France

Filed Jan. 21, 1986, Ser. No. 820,368

Claims priority, application France, Jan. 31, 1985, 85 01353

Int. Cl.[4] F16B *1/00*

U.S. Cl. 403—331 **14 Claims**

1. Releasable connector apparatus comprising:

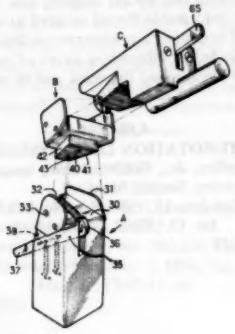
a male part, said male part comprising a wedge member having a truncated tetrahedron shape, said male part comprising first, second, third and fourth faces, said faces being inclined and converging toward a single point defined by an imaginary apex of the truncated tetrahedron;

a female part into which said male part may be inserted and withdrawn by relative translation along an insertion line of direction, said female part comprising first, second and third walls which are inclined and spaced so as to mate

with the first, second and third faces, respectively, of the male part when said male part is inserted into said female part;

releasable locking means mounted for movement between a locking position and a release position;

wherein when said male part is inserted in said female part and said locking means is in said locking position, said



locking means applies a locking force to said fourth face to oppose withdrawal of said male part and to urge the faces of the male part into intimate contact with the walls of the female part;

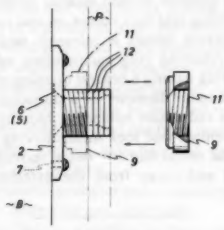
and wherein when said male part is inserted in said female part and said locking means is in said release position said male part is free for withdrawal from said female part.

4,684,286

STRUCTURE FOR COUPLING A BAR-LIKE MEMBER

Takafumi Itagaki, Urayasu, Japan, assignor to Tamatoshi Industries Limited, Tokyo, Japan

Filed Sep. 13, 1985, Ser. No. 776,046
Int. Cl.[4] F16B *7/04*
U.S. Cl. 403—407.1 **5 Claims**



1. A coupling structure comprising:

a holding member having a base body adapted to be fastened to a fixing surface, a cylindrical, externally threaded main body extending perpendicularly from said base body, a bearing hole extending into said main body from the end remote from said base body with an enlarged opening formed at the lower end of the bearing hole for fixing a connecting portion inserted into said bearing hole;

an internally threaded adjustable ring rotatable about said main body for providing an adjustable stop surface; and

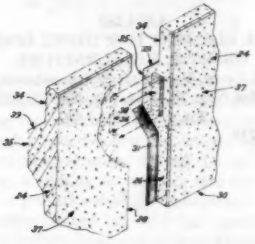
a coupling member having a connecting portion extending into said bearing hole, engaging means having an annular groove formed in the inserting portion thereof, and a contractible snap ring placed in said annular groove and made of an opened circular spring, so that when the connecting portion is inserted into the bearing hole, the snap ring is contracted to have the same or smaller diameter as that of the outer circumference of the connecting portion, and when the lower end of the connection portion reaches the enlarged opening, the snap ring is enlarged to have a larger diameter than that of the outer circumference of the connecting portion so as to be fixed in the enlarged opening so that said members are removably coupled together.

4,684,287

RETAINING WALL CONSTRUCTION AND METHOD FOR ERECTION

Longine J. Wojciechowski, Potomac, Md., assignor to The Reinforced Earth Company, Arlington, Va.

Filed Oct. 2, 1985, Ser. No. 783,211
Int. Cl.[4] E01F *15/00*
U.S. Cl. 404—6 **8 Claims**



1. An improved retaining wall construction for retaining soil, said wall construction comprising in combination:

a plurality of prefabricated, substantially upstanding soil retention panels, each soil retention panel having first and second ends, a bottom surface with at least one cutout portion in the bottom surface for receiving a lifting arm during transportation and installing of the soil retention panel, and a side, the side including a projecting rib having a profile for directing an incident vehicle away from the side;

the first and second ends of each soil retention panel having a top section, a center section incorporating the projecting rib with the vertical length of the projecting rib defining the extent of the center section, and a bottom section;

a keyed construction joint comprised of the first end of the soil retention panel having a projecting portion and the second end of the soil retention panel having a cutout slot for engaging with the projecting portion of an adjacent soil retention panel, the cutout slot encapsulating the projecting portion of an adjacent soil retention panel in a contacting relationship for preventing movement of the soil retention panels in vertical and horizontal directions for defining a retention wall having a generally planar face, the keyed construction joint positioned entirely within the center section of the first and second ends of the soil retention panels for distributing impact forces uniformly; and

means attached to one side of the soil retention panel and extending into the soil for supporting the soil retention panel in an upright position.

4,684,288

ASPHALTIC PAVEMENT TILES

Xavier Chapa, 45 S. Ridge, Canyon, Tex. 79015

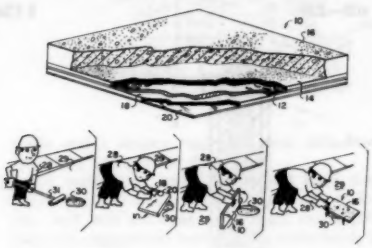
Filed Jan. 22, 1986, Ser. No. 821,496
Int. Cl.[4] E01C *5/12*
U.S. Cl. 404—35 **9 Claims**

1. A method of repairing deteriorated wear course of road surfaces, comprising the steps of:

a. peeling a flexible backing from a bottom of a pavement tile with the longest dimension not more than about 3 feet,

b. exposing a wear course adhesive coating over the bottom of the pavement tile,
c. inverting the pavement tile so that an asphalt aggregate mix layer over a top of the pavement tile faces upward,
d. positioning the pavement tile above a deteriorated portion of wear course of a road surface, and
e. placing the wear course adhesive coating of the pavement tile against the deteriorated wear course.

5. A tile for repairing deteriorated wear course of road surfaces, comprising:



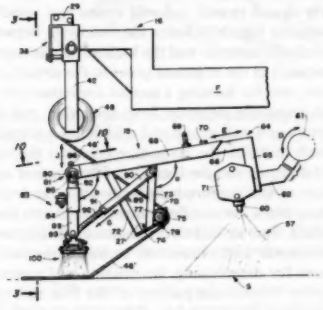
a. a reinforcing geotextile fabric having a standard desired surface area and shape,
b. asphalt adhesive applied over a top of the fabric,
c. compacted asphalt aggregate mix applied to a thickness of about one fourth inch over the asphalt adhesive,
d. wear course adhesive applied over a bottom of the fabric,
dd. said tile not more than about 3' in its longest dimension,
e. said wear course adhesive providing means for adhering the tile to a wear course being repaired, and
f. a peelable backing applied over the wear course adhesive.

4,684,289

ROAD COATING METHOD AND APPARATUS

Edward C. Gnesa, 160 Patterson Rd., Santa Maria, Calif. 93455

Filed Jun. 13, 1986, Ser. No. 874,033
Int. Cl.[4] E01C *19/48*
U.S. Cl. 404—75 **20 Claims**



1. An apparatus for coating a roadway with oil and a layer of paving fabric dispensed from a roll having a core by means of a moving vehicle with a frame to which is attached an oil spreader unit including an elongated oil beam with oil spraying means for dispersing oil onto the roadway in a continuous manner including application of a continuous layer of paving fabric onto the oil comprising:

a roll engagement assembly comprising a boom secured to the vehicle frame transverse of the vehicle longitudinal axis and slide connector means slidably engaged to each opposing outer portion of said boom including attachment means for connection with a roll arm for releasable engagement with the roll of paving fabric;

drive means for moving said slide connector means axially along said boom; and,

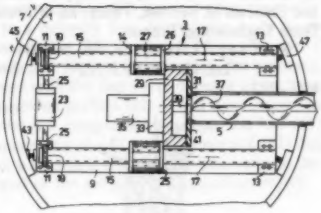
a fabric guide and press assembly connected to said oil beam by framework means, said fabric guide and press assembly comprising a guide shaft aligned coextensive with said boom and, fabric press means adjacent said guide shaft for pressing fabric from said roll against the roadway, said framework means comprising a support member releasably connected to each opposing end of said beam, mount means secured to said member for supporting the guide shaft and pivot means joining each member with said fabric press means, said fabric press means including a broom beam joined to said support member by said pivot means and connector means for attaching fabric embedding means.

4,684,290

APPARATUS FOR BELOW-GROUND DRIVING OF PIPELINE SEGMENTS

Gerd Soltau, Artlenburger Landstr.15, D-2120, Lüneburg, Fed. Rep. of Germany

Filed Jan. 15, 1986, Ser. No. 818,890
Claims priority, application Fed. Rep. of Germany, Jan. 18, 1985, 3501536
Int. Cl.[4] F16L *1/02*
U.S. Cl. 405—184 **10 Claims**



1. An apparatus for below-ground driving of pipeline segments made from lengths of production pipe which comprises a driving apparatus and a thrust bridge disposed in a jacking shaft and arranged to drive lengths of pipeline via said thrust bridge, said driving apparatus comprising oppositely disposed threaded drive mechanisms (14) including parallel threaded spindles (15) associated drive means (19) disposed in parallel within the jacking shaft by means of which said threaded drive mechanisms and said thrust bridge are movable back and forth, a motor drive means arranged to rotate said associated drive means and said threaded spindles of said threaded drive mechanisms about their axes of rotation.

4,684,291

TEMPLATE LEVELLING DEVICE

Hans P. Hopper, Whiterashes, Scotland, assignor to British Petroleum Company p.l.c., London, England

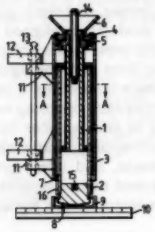
Filed May 2, 1986, Ser. No. 858,753
Claims priority, application United Kingdom, May 8, 1985, 8511605
Int. Cl.[4] E02B *17/02*
U.S. Cl. 405—190 **7 Claims**

1. A screw jack for levelling a subsea template by means of a remote drive shaft, the screw jack comprising:

(a) A guided entry adapted to receive a remote flat-sided drive shaft,
(b) An inner screw adapted to be rotated by the drive shaft,
(c) A non-rotatable inner housing, through one end of which the screw is threaded,
(d) A non-rotatable outer housing, against one end of which

the screw bears, the outer housing being axially moveable relative to the inner,

(e) A base against which the inner housing rests, and



(f) One or more projections on the outer housing adapted to bear against corresponding projections on the template, the arrangement being such that rotation of the drive shaft causes relative axial motion between the inner and outer housings.

4,684,292

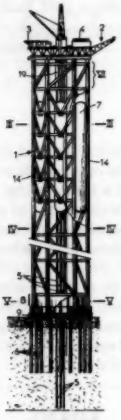
OSCILLATING PLATFORM ON FLEXIBLE PILES FOR WORK AT SEA

Loic M. J. Danguy des Deserts; Dominique Michel, both of Paris, and Francois G. Sedillot, Velizy, all of France, assignors to Doris Engineering, France

Filed Aug. 12, 1985, Ser. No. 764,604

Int. Cl.[4] E02B *17/02*

U.S. Cl. 405—202 **7 Claims**



1. An oscillating platform for work at sea, said platform having a weight, comprising a deck, a lattice tower having an upper part and a lower part, said tower further having a total buoyancy center, and a center of gravity, an articulation formed by flexible piles, said articulation having a center; the flexible piles being driven into the sea bed and fixed to the upper part of the tower; the tower comprising floaters in its upper part and a ballast compartment in its lower part, as well as means for resisting shear forces; the product of the total buoyancy of the tower by the distance between the buoyancy center of the tower and the center of the articulation being at least equal to 1.25 times the product of the weight of the platform by the distance between the center of gravity of the platform and the center of the articulation.

4,684,293

CABLE FOR FASTENING STRUCTURES AND METHOD OF DETECTING DAMAGE TO CORROSION-PREVENTIVE LAYER THEREOF

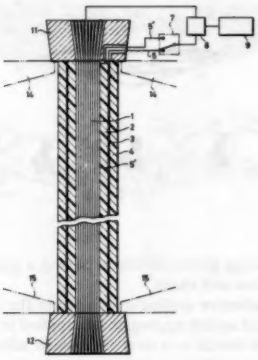
Hideo Takafuji, Kawasaki, Japan, assignor to Nippon Steel Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 592,335, Mar. 21, 1984. This application Oct. 31, 1985, Ser. No. 793,688

Claims priority, application Japan, Mar. 23, 1983, 58-47157; Mar. 23, 1983, 58-47158

Int. Cl.[4] E02D *5/74*

U.S. Cl. 405—224 **5 Claims**



1. A cable for fastening structures, which comprises:

a strand made up of a large number of element wires;

a corrosion-preventive layer surrounding the peripheral surface of the strand;

a cylindrical conductive resistance detector extending inside and over the entire length of the cable in a manner to surround said strand;

an electrically insulating layer between said resistance detector and said strand;

means for measuring resistance having: a means for forming a first resistance circuit through said resistance detector from one end thereof, a rupture through said insulating layer to said strand, and said strand and which has a first resistance which includes the resistance between the one end of said detector and the location of the rupture and the resistance at the ruptured point to the strand connected in series, and for forming a second resistance circuit through said resistance detector from the other end thereof, the rupture and said strand and which has a second resistance which includes the resistance between the other end of said detector and the location of the rupture and the resistance at the ruptured point to the strand connected in series, and a current flow measuring means for measuring current flow in said two resistance circuits; and

an arithmetic unit connected to said resistance measuring means for determining the position and magnitude of the rupture from a comparison of the first and second resistances and the resistance of the entire length of said resistance detector.

4,684,294

RETAINING WALL CONSTRUCTION ELEMENT

Raymond J. O'Neill, 3 Garmany Pl., Yonkers, N.Y. 10710

Filed Jan. 15, 1986, Ser. No. 819,127

Int. Cl.[4] E02D *5/00*

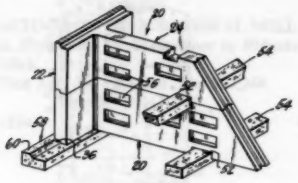
U.S. Cl. 405—286 **15 Claims**

1. A retaining wall construction element for retaining a soil mass comprising:

(a) an upstanding face panel, said face panel being a pris-

matic solid having a forward wall, a rearward wall, side walls, and a top and bottom wall;

(b) an embedment beam integrally extending from the rearward wall of said face panel in a generally T shaped arrangement in plan view, said embedment beam being a prismatic solid having an upper wall, a lower wall, side



walls, and a sloping rear wall, said embedment beam extending into said soil mass; and

(c) said embedment beam having soil mass engagement means disposed on at least one of said side walls and said rear wall, said soil mass engagement means providing a frictional engagement between said embedment beam and said soil mass.

4,684,295

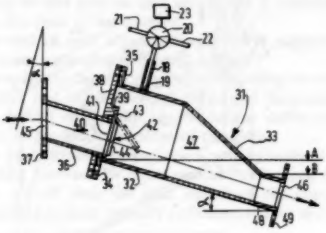
INTERMITTENTLY OPERATING PNEUMATIC DEVICE FOR PUMPING SOLID-CARRYING LIQUIDS AND SLURRIES

Jean-Francois Ranson, 23 cité Leferrer, 62970 Courcelles-les-Lens, France

Filed Nov. 13, 1985, Ser. No. 797,644

Int. Cl.[4] B65G *53/30*

U.S. Cl. 406—50 **7 Claims**



1. Intermittently operating pneumatic pumping device for a solid-carrying liquid or slurry and intended to be under a continuous load, and comprising:

a tubular body (1,31) defining an inner chamber with an entry port (15,45) and a delivery port (16,46) opening into the upstream and downstream ends, respectively, thereof;

at least one injection line for a compressed gas (18) opening into the inner chamber via at least one pressurization port (19);

a supply valve (20) connected to each injection line (18) and intended to be connected to a source of compressed gas (21) to provide a selective supply of compressed gas to each injection line (18); and

a means of controlling (23) the supply valve (20); characterized in that the pumping device additionally comprises a single flap valve (12,42) mounted on a support (8,39) fixed inside the inner chamber, between the entry port and the pressurization port, and cooperating with a seat internal to the body, surrounding a passage port (11,41), for the solid-carrying liquid or slurry and defining, between it and the delivery port, a part of the inner chamber which constitutes a pumping chamber (17,47), the flap valve (12,42) pivoting, on, the one hand, towards the delivery port (16,46), in a position in which the pumping chamber is filling, in the absence of injection of compressed gas via the pressurization port (19) and under the pressure of the solid-carrying liquid or slurry which tends to enter the pumping chamber (17,47) through the passage port (11,41), and, on the other hand, in the opposite direction, towards the seat against which the valve (12,42) is applied in a leakproof manner in a position in which the pumping chamber (17,47) is closed upstream and is emptied downstream under the effect of an injection, via the pressurization port, of compressed gas which expels the volume of solid-carrying liquid held in the pumping chamber, out of the latter, via the delivery port, the lowest point of the pumping chamber in the region of the flap valve seat being at a level which is at least as high as the level of the highest point of the pumping chamber in the region of the delivery port, the pumping chamber (47) is defined in the tubular body (31) which consists of an upstream part in the shape of a cylindrical shell (32), into which a single injection line (18) opens via a single pressurization port (19), and which is extended in the downstream direction by a funnel (33), having substantially the shape of the frustum of a cone offset downwards, the upstream end of the cylindrical shell (32) of the body (31) has a flange (34) for coupling to a flange (38) at the downstream end of a filling pipeline (36) which opens into the cylindrical shell (32) defining the entry port (41) into the body (31), the flap valve (42) being supported by the downstream flange (38) of the filling pipeline (36), and the downstream end of the funnel (33) being extended in the downstream direction by a delivery pipeline (48) incorporating means for coupling (49) to a delivery line, the tubular body having an upstream section (36) forming a filling chamber (40) and a downstream section (31) forming the pumping chamber (47) and with the flap valve opening in the lowest part of the upstream portion (32) of this downstream section (31) whereas the compressed gas injection line (18) opens in the upper part of said upstream portion (32) through port (19) in a direction substantially transverse to the direction of travel of the solid-carrying liquid or slurry.

4,684,296

METHOD AND APPARATUS FOR THE GENERATION AND UTILIZATION OF A SPIRAL GAS STREAM IN A PIPELINE

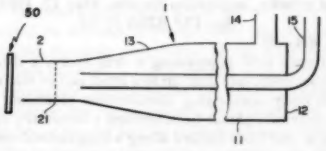
Kiyoshi Horii, and Toshiaki Murata, both of Tokyo, Japan, assignors to Kiyoshi Horii, Tokyo, Japan

Continuation of Ser. No. 635,822, Jul. 30, 1984, abandoned. This application Oct. 24, 1986, Ser. No. 924,185

Claims priority, application Japan, Aug. 1, 1983, 58-139338; Aug. 5, 1983, 58-142601; Aug. 24, 1983, 58-153150; Aug. 24, 1983, 58-153151

Int. Cl.[4] B65G *53/42*

U.S. Cl. 406—153 **5 Claims**



1. A method for generation of a spiral gas stream in a pipeline which comprises the following steps:

forming a uniform flow of gas in a cylinder with first and second ends, the first end adapted for connecting to a pipeline pipe, said second end being closed with a bottom plate and said cylinder having an inner diameter larger than that of said pipeline pipe, by introducing feed gas into

said cylinder through a gas inlet pipe so as to make the flow line of the feed gas substantially intersect the longitudinal axis of the cylinder;

bringing the mean gas flow velocity in said cylinder to a mean gas flow velocity less than 10 meters per second;

introducing said uniform flow of gas flowing in said cylinder into the inlet of said pipeline pipe through a funnelform reducer connected at said first end of said cylinder; and

bringing the mean gas stream velocity in the pipeline pipe to a mean velocity greater than 20 meters per second.

4,684,297

MILLING CUTTER FOR CUTTING THE CONTAMINATED SURFACE OF CONCRETE

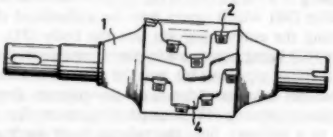
Naoyoshi Funakawa, Koshigaya; Hajime Demura, Kawaguchi, and Nobuyuki Nagamori, Ichikawa, all of Japan, assignors to Sato Kogyo Co., Ltd., Toyama and Hitachi Carbide Tools Ltd., Narita, both of, Japan

Filed Jan. 13, 1986, Ser. No. 818,324

Claims priority, application Japan, May 14, 1985, 60-71227[U]

Int. Cl.⁴ B23C *5/00, 5/20*

U.S. Cl. 407—41 **12 Claims**



1. A milling cutter for cutting contaminated surfaces, particularly radioactive contaminated concrete, comprising:

an elongated body having an outer surface extending between opposite axial ends of said body;

a plurality of independently arranged guide grooves on said outer surface, said guide grooves having edges sloped downwardly from said axial ends toward an axial center of said body; and

a plurality of cutter chips arranged in at least two groups defining preceding and following groups, each of said groups having at least four cutter chips spaced along a generally V-shaped path, the cutter chips in the following group being located in positions corresponding to positions of the cutter chips in the preceding group, each of said cutter chips in the following group bridging a gap in an axial direction of said body between two of the cutter chips in the preceding group.

4,684,298

DRILL

Aage V. Roos, Skärplinge, Sweden, assignor to Santrade Limited, Lucerne, Switzerland

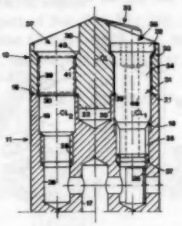
Filed May 16, 1986, Ser. No. 864,146

Claims priority, application Sweden, May 17, 1985, 8502450

Int. Cl.⁴ B23B *51/02*

U.S. Cl. 408—59 **7 Claims**

1. A rotary drill comprising a drill body, a drill tip, and fasteners securing said drill tip to a front end of said drill body; said drill body comprising front-to-rear extending first chip flutes, a generally planar front surface, a forwardly open recess disposed in said front surface along a longitudinal centerline of said drill body, first holes for receiving said fasteners, and fluid passages for conducting drilling fluid to said drill tip; said drill tip including a generally planar rear surface resting against said front surface, a tap projecting rearwardly from said rear surface and disposed in said recess, second chip flutes aligned with and forming forward extensions of said first chip flutes, cutting edges disposed at front ends of said second chip flutes, a plurality of longitudinally extending second holes aligned with said first holes, said first and second holes together defining fastener-receiving hole means for receiving said fasteners which extend between said drill body and said drill tip for urging said drill tip against said drill body and transmitting rotary forces from said drill body to said drill tip; and thin cylindrical collets



positioned in said hole means between said fasteners and walls of said hole means, said collets formed of a softer material than said fasteners so as to be deformable to compensate for dimensional imprecisions between said fasteners and said walls of said hole means.

4,684,299

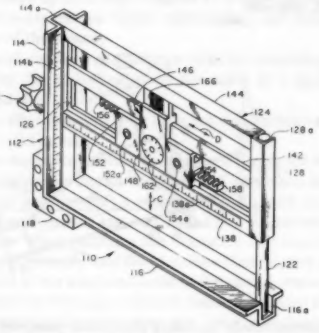
LIBERTY JIG

Roger J. Laliberte, 26 Beach Ave., Port Jefferson Station, N.Y. 11776

Continuation-in-part of Ser. No. 754,946, Jul. 15, 1985, abandoned. This application Sep. 4, 1986, Ser. No. 903,731

Int. Cl.⁴ B23B *49/00*

U.S. Cl. 408—115 R **6 Claims**



1. An adjustable jig for locating drill holes on cabinet doors and drawers comprising:

a. stationary L-shaped means comprising a pair of legs at right angles to each other capable of engaging either the right or left hand corner of a cabinet door or drawer;

b. slide assembly means mounted on said L-shaped means for movement in a direction parallel to one leg of said L-shaped means and at right angles to the other leg of said L-shaped means;

c. means mounted on one leg of said L-shaped means to lock said slide assembly means after the latter is positioned;

d. means mounted on said slide assembly means for locating, and accommodating a drill bit for, a pair of holes to be drilled in a cabinet door or drawer; and

e. said mounted means comprising a main body means slidable on said slidable assembly along an axis at right angles to said one leg of said L-shaped means and parallel to said other leg of said L-shaped means, a pair of first and second positioners located on opposite sides of said main body means along said axis, differentially actuated rack and pinion means connecting said positioners to said main

body means including adjustment means on said main body means utilizing said rack and pinion means to permit the simultaneous movement of said positioners along said axis to adjust the spacing between said positioners, each of said positioners including an opening for said drill bit.

4,684,300

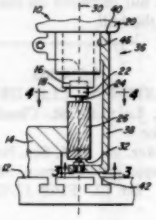
ATTACHMENT FOR A VERTICAL MILL

Douglas Break, Plymouth, Mich., assignor to Ridgetown Ltd., Plymouth, Mich.

Filed Apr. 30, 1986, Ser. No. 857,244

Int. Cl.[4] B23C *1/00*

U.S. Cl. 409—134 **4 Claims**



1. For use in conjunction with a vertical mill having a quill and a spindle rotatably mounted within the quill, said spindle having means for clampingly holding one end of a milling cutter so that, upon rotation of said spindle, said spindle rotatably drives said milling cutter, said quill being axially slidably mounted in a column, said column having a flat and radially extending surface, a cutter support comprising,

an elongated housing having two spaced ends,

means for removably clampingly attaching one end of said housing to said quill so that said cutter is positioned between the ends of the housing,

said one end of said housing having a flat surface which flatly abuts against said column surface,

means attached to the other end of said housing for engaging the other end of the milling cutter and supporting said other end of the cutter against lateral deflection with respect to the axis of rotation of the cutter

wherein said housing comprises a semicylindrical cavity extending between its ends, said cavity having an axial length greater than the axial length of the cutter, said cutter being at least partially contained within said cavity.

4,684,301

MACHINE TOOL SPINDLE AND TOOL HOLDER

Otto Eckle, Loechgau, Fed. Rep. of Germany, assignor to Komet Stahlhalter- und Werkzeugfabrik, Besigheim, Fed. Rep. of Germany

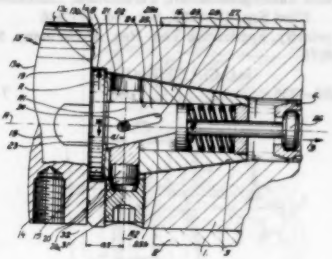
Filed May 6, 1986, Ser. No. 860,284

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1985, 8517718

Int. Cl.[4] B23Q *3/12*; B23B *31/02*

U.S. Cl. 409—232 **14 Claims**

1. In a machine tool spindle and tool holders suitable therefor, with various different shanks capable of being interchangeably inserted in the head of the spindle, which machine tool spindle has a frusto-conical receiving bore for the reception of a steeply tapered conical shank of a first tool holder, an end surface surrounding the receiving bore and a cylindrical mating bore located in the region of the frusto-conical receiving bore and serving for the reception of a cylindrical mating extension on the shank of a second tool holder which is provided at one end of the mating extension with a flange concentric therewith and at the other end of the mating extension with a frusto-concial part which is received with play in the frusto-conical receiving bore when the flange is in contact with the said end surface, the improvement comprising wherein the mating bore (8) directly adjoins the end surface (4) of the spindle (1) and the diameter (D) thereof is slightly greater than the theoretical diameter (d1) of the frusto-conical receiving



bore (3) in the plane of the end surface (4) and that the axial length (L) of the mating bore (8) is in the range of 10 to 15% of the theoretical diameter (d1).

4,684,302

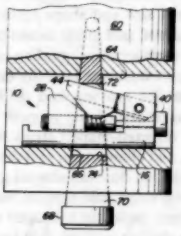
KEEPER FOR MACHINE TOOLS AND THE LIKE

Dennis L. George, 8566 SE. Roots Rd., Clackamas, Oreg. 97015

Filed Sep. 19, 1986, Ser. No. 909,384

Int. Cl.[4] B23C *5/26*

U.S. Cl. 409—233 **5 Claims**



1. A machine tool keeper comprising an L-shaped member having an elongated horizontal leg serving as a base and an integral upstanding leg providing an anchor at one end of the base, said anchor being bifurcated to provide a slot running lengthwise as respects the base and having a closed bottom adjacent to the base and an open top at the top of the anchor, a block carried by the base in horizontally spaced relation to the anchor and movable lengthwise of the base, the block having a tapped bore horizontally coaxial with the bottom of the slot in the anchor, said block further having a ramp facing toward the anchor and running uphill from the base and away from the anchor, a tongue having a tail received in the slot and pivoted to the anchor on a transverse horizontal axis above the bottom of the slot and further having a body portion overlying and adapted to ride on the ramp during movement of the block, and a horizontal screw passing through the slot, below the tongue and tongue pivot and threaded into the block bore and having a head abutting the anchor from the side thereof opposite to the extent of the tongue, said screw being turnable to draw the block toward the anchor and thus to cause the tongue body to ride up the block ramp and away from the base.

4,684,303

DRILL STAND WITH A GUIDE COLUMN

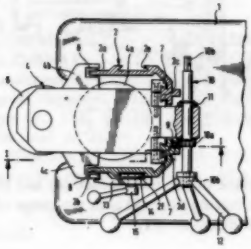
Wolfgang Erdt; Rudolf Reitberger, both of Munich, Fed. Rep. of Germany, and Erwin Stocker, Balzers, Liechtenstein, assignors to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Sep. 17, 1985, Ser. No. 777,026

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 3434075

Int. Cl.[4] B23B *45/14*

U.S. Cl. 409—235 **7 Claims**



1. Drilling stand comprising a base plate having a support plane, an elongated guide column connected to said base plate and extending transversely of and outwardly from the support plane thereof, a drilling device including a drilling tool mounted on said guide column and being movable along the elongated direction thereof, guide means in said guide column, means for moving said drilling device on said guide column, wherein the improvement comprises that said drilling stand is movable for drilling holes at different locations in a stationary hard receiving material, said guide column includes two laterally spaced parallel elongated support members having the same cross-sectional size and shape transversely of the elongated direction thereof, said guide means being formed in each of said support members for guiding said drilling device thereon, said support members laterally enclosing said drilling device, said means for moving said drilling device includes engagement means on one of said support members, said guide means comprises dovetail-shaped strips formed on each said support members, and elements on said drilling device forming correspondingly shaped dovetail-shaped grooves for receiving said dovetail-shaped strips, said support members are L-shaped in transverse section, each said L-shaped support member has a longer leg and a shorter leg with said longer legs disposed in parallel relation and said shorter legs extending from said longer legs toward one another and being disposed in spaced relation, and said elements having dovetail-shaped grooves are detachably secured to said drilling device.

4,684,304

COMPOSITE STUD

Theodore E. Franks, Long Beach, Calif., assignor to Hitco, Newport Beach, Calif.

Filed Apr. 24, 1986, Ser. No. 855,236

Int. Cl.[4] F16B *37/06*; B63B *3/00*

U.S. Cl. 411—171 **3 Claims**

1. A fabricated structure particularly adapted for use in a marine environment and comprising a steel submarine hull, a composite stud including a steel tip portion welded to an outer side of the hull and a main body portion of a corrosion-resistant alloy provided with external threads and forming a major part of the composite stud, a fairing mounted on the stud, and an

internally threaded nut threaded on the stud and holding the fairing in place on the hull.

4,684,305

FASTENING CLIP DEVICE

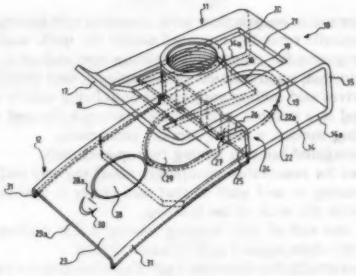
Dominique Dubost, La Celle St. Cloud, France, assignor to Rapid S.A., France

Filed Mar. 20, 1986, Ser. No. 841,781

Claims priority, application France, Mar. 29, 1985, 85 04844

Int. Cl.[4] F16B *37/02*

U.S. Cl. 411—174 **14 Claims**



1. A fastening clip device comprising

a resiliently deformable, substantially U-shaped element having a base and two legs,

a fitting member for fitting said U-shaped element onto an edge of an object by being interposed between said two legs so as to hold said legs apart prior to fitting onto the object edge, and being movable relative to said legs so as to be displaceable under action of the object as said legs pass over edge surfaces of the object, and

means provided on at least one of said two legs for releasing said legs at the end of the displacement of said fitting member in a vicinity of said base, to allow said legs to close onto the object edge.

4,684,306

AUXILIARY WORKOVER RIG

Jimmy D. Brewer, Houma; Albert W. Gunther, Jr., New Orleans, and Albert W. Gunther, Sr., Gretna, all of La., assignors to Pressure Services, Inc., Houma, La.

Continuation-in-part of Ser. No. 410,532, Aug. 23, 1982, Pat. No. 4,470,739. This application Jul. 23, 1984, Ser. No. 633,415

The portion of the term of this patent subsequent to Sep. 11, 2001, has been disclaimed.

Int. Cl.[4] E21B *19/00*

U.S. Cl. 414—22 **6 Claims**

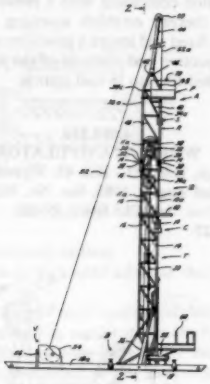
1. An auxiliary rig adapted to be used in combination with a primary drilling rig, the primary rig having an elongated upstanding drill tower, a base therefor, and crown block means with the drill tower for raising and lowering tubular members

for vertical storage of threadedly interconnected pairs of tubular members of the type forming a drill string, comprising:

an auxiliary tower adapted to be mounted to the apex of a primary rig forming an elongate extension thereof, said auxiliary tower for receiving interconnected pairs of tubular members raised and lowered by the crown block means for reducing the tripping time of the tubular members into and out of tne well;

mounting means with said auxiliary tower for detachably mounting said auxiliary tower to the apex of a primary rig;

a pipe rack with said auxiliary tower for permitting ease in



substantial vertical racking and storing of the interconnected pairs of tubular members with said auxiliary tower;

at least one racking table adapted to be mounted on the base of the primary rig and disposed adjacent the lower end of the primary rig for supporting vertically stored threadedly interconnected pairs of tubular members on the base of the primary rig;

movable slip means operably guided by said auxiliary tower for releasably supporting the pairs of tubular members; and

moving means with the primary rig for moving said slip means to selectively tension the drill string.

4,684,307

ARRANGEMENTS FOR HANDLING CONICAL THREAD PACKAGES

André Lattion, Seuzach; Alfred Carl, and Reinhard Oehler, both of Winterthur, all of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

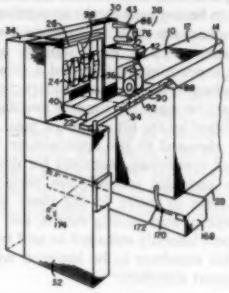
Filed Dec. 3, 1984, Ser. No. 677,175

Claims priority, application United Kingdom, Dec. 2, 1983, 8332252

Int. Cl.[4] B65G *47/24, 57/22*

U.S. Cl. 414—31 **29 Claims**

16. An installation for transporting conical thread packes, comprising conveying means for moving packages in succession along a predetermined path; means for halting each package at a package orientation station by temporarily terminating at said station the conveying action exerted on the respective package by said conveying means, and a package orienting unit disposed above said conveying means at said station, including a pair of package engaging members movable between a first relative disposition thereof in which said package engaging members are situated outside said predetermined path so as not to interfere with the movement of the respective package into and out of the station, and a second relative disposition in which said package engaging members engage the respective package at said station at opposite sides of the respective package, a package orientation sensor carried by at least one of said package engaging members and operative for sensing the orientation of the respective package engaged by said package engaging members, selectively operable means for raising and lowering said package engaging members to lift the respective package which is engaged thereby clear of said conveying



means and to return such package to said conveying means, and means for rotating said package engaging members in their raised position to reverse the orientation of the respective package engaged thereby.

4,684,308

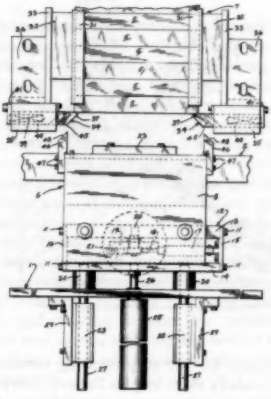
STACKER ASSEMBLY FOR A CONVEYOR SYSTEM

Wolfgang C. Dorner, Oconomwooc, Wis., assignor to Dorner Mfg. Corp., Hartland, Wis.

Filed Aug. 28, 1985, Ser. No. 770,397

Int. Cl.[4] B65G *57/30*

U.S. Cl. 414—96 **6 Claims**



1. A stacker assembly for a conveyor system, comprising a conveyor to convey a plurality of articles, said articles having a size such that the side edges of the articles overhang the corresponding sides of the conveyor, a pair of lift members disposed on opposite sides of the conveyor and being movable laterally of the conveyor between an outer retracting position and an inner lifting position, each lift member having an inner edge arranged to be disposed laterally outward of the corresponding side of the conveyor beneath the corresponding overhanging edge of the article when the lift member is in the lifting position, a storage rack disposed above the conveyor, lifting means for lifting said lift members to lift the articles from the conveyor into the storage rack, said storage rack including a pair of spaced support members disposed to support an article in said storage rack, said support members being movable between an outer retracted position in which said support members are spaced apart a sufficient distance to permit an

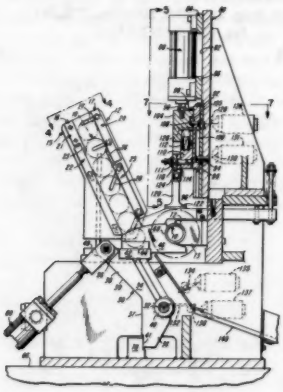
article to pass therebetween, and an inner supporting position where said support members will support opposed side edges of said article, biasing means for biasing said support members to the supporting position, a first cam surface on each of said lift members, a second cam surface on each support member and disposed to be engaged by the respective first cam surfaces as the lift members are elevated to move the support members to the retracted position, each support member having an upper article supporting surface and a downwardly and outwardly extending lower surface constructed and arranged to prevent contact between the support member and the article as the article is lifted by the lift members, means responsive to the article being elevated to the approximate level of the upper surface of said supporting members for disengaging said first cam surfaces and said second cam surfaces to permit said support members to move to the inner supporting position under the force of said biasing means, and means for moving the lift members laterally outward to said retracted position to permit said lift members to be lowered without interference with said support members.

4,684,309

SYSTEM AND APPARATUS FOR USE IN FABRICATING SMALL TUBULAR ARTICLES

Charles Horn; Rickey L. Kelly; Thomas E. Orendorf, and Terry L. Kiger, all of Dayton, Ohio, assignors to Vulcan Tool Company, Dayton, Ohio

Filed Aug. 29, 1983, Ser. No. 527,038
Int. Cl.[4] B65H *29/00*
U.S. Cl. 414—224 **17 Claims**



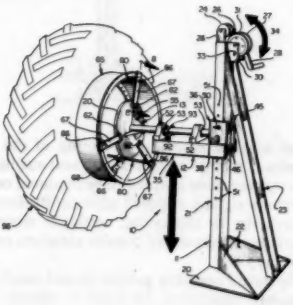
1. Apparatus for use in processing tubular or cylindrical stock, particularly short lengths thereof, into precision formed end products comprising means for delivery of said stock to a working station, means operable to establish the precise setting required of said stock with reference to applied tooling on the presentation thereof in said station, said delivery means including a downwardly inclined channelling device and a transfer device, said channelling device being a chute-like structure receiving said stock at an upper portion thereof and discharging said stock from a lower portion thereof, said transfer device comprising a pivotally mounted arm an outermost portion of which embodies means for receiving, nesting and positioning said stock as it is discharged from said chute-like structure to place said stock in substantially that attitude in which it must be presented for the working of one or more end portions thereof, means to cycle said arm between said lower portion of said chute-like structure and said working station, said arm being so formed and positioned in said cycling that said outermost portion thereof including said receiving means positions immediately of said lower portion of said chute-like structure to receive and nest therein an element of said stock which is discharged therefrom and carry said stock therewith to said working station, said means operable to establish said precise setting of said stock comprising a plurality of finger-like elements mounted on and for movement relative to a support structure adjacent said working station, portions of said finger-like elements being normally spread and having means operatively related thereto to induce the common movement thereof towards each other, on the placement thereof adjacent to said stock delivered to the working station, to close on end portions thereof, said fingers being operable, in the closing thereof to contain said stock and place a predetermined point of its axial length in a location coinciding with a predetermined point in said station, to thereby establish a setting for said stock in which it may be fixed and insure a precision working of one or more of the respective end portions of the stock, as so set, by the tooling applied thereto in said station.

4,684,310

WHEEL MANIPULATOR

Charles E. Stange, R.R. #2 - Box 45, Wyoming, Ill. 61491

Filed Aug. 6, 1985, Ser. No. 762,861
Int. Cl.[4] B60B *29/00*
U.S. Cl. 414—427 **3 Claims**



1. A wheel manipulator for manipulating a wheel having a hub comprising a base frame having a vertical column, a carriage slidably mounted on said column and adapted to be vertically adjustably positiond thereon, a turret rotatably mounted on said carriage and means for retaining a wheel hub to said turret, said retaining means having a plate secured to said turret in axial engagement with said hub and having a plane positioned transversely to the axis of rotation of said turret, and means for securing said wheel hub to said plate, said hub has an internal rim flange and said securing means comprises rim clamps adapted to be circumferentially secured to the internal rim flange of said hub, plate anchors secured to said plate in radial positions therearound and respectively adapted to engage said rim clamps to secure said hub against movement relative to said plate to be manipulated therewith, said rim clamps comprise U-shaped brackets having two leg portions interconnected at one end by a curved portion adapted to be frictionally radially received over said hub rim with said leg portions of each of said brackets being respectively positioned radially on respective opposite radial sides of the rim and the curved portion of said brackets positioned radially inwardly from said rim, said brackets having aligned openings through the legs thereof adjacent the curved portion thereof with one of said openings being threaded to threadably receive a threaded shaft, said plate anchors having a shaft with a threaded end inserted through the other of said openings in a respective rim bracket and threadably retained in said threaded opening of said bracket, and a hooked end adjacent said plate, and adjustable attachment means adapted to engage said hook end of said shaft and said plate for retaining said rim and hub to said plate.

4,684,311
LOAD TRANSPORTING APPARATUS

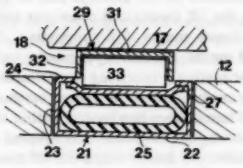
Edward A. Dickson-Wright, and Derick A. Lacey, both of Crowthorne, England, assignors to Package Control Limited, Crowthorne, England

Continuation of Ser. No. 526,000, Aug. 24, 1983, abandoned. This application Sep. 30, 1985, Ser. No. 782,147

Claims priority, application United Kingdom, Aug. 27, 1982, 8224718

Int. Cl.[4] B65G *25/02*

U.S. Cl. 414—535 **4 Claims**



1. Apparatus for transporting loads on and off vehicles, comprising:

a vehicle load receiving surface;

a loading platform to be loaded adjacent the load receiving surface;

channel-shaped elongate track lengths on the load receiving surface and the loading platform, the track lengths being generally in alignment with one another during operation;

an inflatable tube contained in the base of the channel of each track length;

a plate movably supported on each tube whereby upon inflation of the tube the plate is raised relative to the associated track length;

a movable skate comprising two or more interconnected lengths articulated relative to one another to accommodate misalignment of the track lengths, the skate supporting the load for movement along the track lengths between the load receiving surface and the loading platform;

wherein the skate lengths each include a plurality of rollers on their underside and a load bearing surface on their upper side, the rollers being spaced and arranged to be received on the movable plate to selectively enable the skate to be movable along the track lengths supporting a load when the plate is raised upon inflation of the tube, and to be movable along the track lengths independently of the load when the plate is in a lowered position upon deflation of the tube, the load bearing surface of the skate being raised when the plate is moved to its upper position to engage and lift a load above the skate from the loading platform and from the vehicle receiving surface; and

wherein the upper surface of the plate receiving the rollers being profiled to provide a central longitudinal depression with upwardly inclined side portions whereby the location of the skate on the plate is self-centering and the skate is inhibited from engaging the track lengths.

4,684,312
ROBOTIC WRIST

Richard S. Antoszewski, Glenshaw, and Daniel P. Soroka, Imperial, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 605,495, Apr. 30, 1984, abandoned. This application Mar. 24, 1986, Ser. No. 844,242

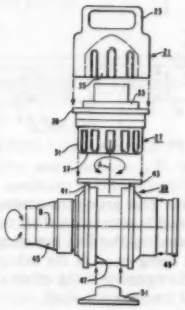
Int. Cl.[4] B25J *17/02*

U.S. Cl. 414—735 **7 Claims**

1. A modular robotic wrist system for use with an industrial manipulator or the like comprising:

a mounting bracket defining a chamber-like interior and having first means at one end thereof for attaching said mounting bracket onto an arm of an industrial manipulator, and having second means at the opposite end thereof for removably securing thereto an A-axis wrist module;

said A-axis wrist module which provides a first degree of freedom comprising a mounting plate having means therewith for the detachable mounting of said A-axis module to said mounting bracket second means, a first rotating member rotatably mounted on said mounting plate which first rotating member includes a bottom portion onto which a B-axis module is mounted, and first drive means in mechanical communication therewith for effecting the rotational movement of said rotating member relative to said mounting plate about a first axis of rotation which first axis is generally parallel with the arm of the robot onto which said mounting bracket and said A-axis wrist are mounted and wherein said first drive means is enclosed within said chamber-like interior of said mounting bracket; and



said B-axis wrist module which provides a second degree of freedom which is generally perpendicular to said first degree of freedom comprising a housing having a mounting plate for the detachable mounting thereof to said bottom portion of said A-axis wrist module, a second rotating member rotatably mounted in said housing and second drive means disposed in said housing and in mechanical communication with said second rotating member for effecting the rotational movement thereof relative to said housing about a second axis of rotation, said second axis being substantially perpendicular to said first axis of rotation and said B-axis wrist mounting plate and wherein said second rotating member includes a first and a second mounting flange which detachably receives an end effector or the like thereon, said first mounting flange being mounted on said rotating member for radially spaced rotation about said second axis and said second mounting flange being mounted on said second rotating member for rotation on said axis.

4,684,313
WRIST DEVICE OF INDUSTRIAL ROBOT

Yoshihiko Minematsu; Minoru Tanaka; Masayuki Yamamoto, and Kenichiro Sakamoto, all of Fukuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP84/00435, § 371 Date Mar. 14, 1985, § 102(e) Date Mar. 14, 1985, PCT Pub. No. WO85/03024, PCT Pub. Date Jul. 18, 1985

PCT Filed Sep. 11, 1984, Ser. No. 714,207

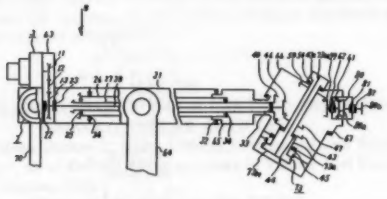
Claims priority, application Japan, Jan. 13, 1984, 59-5065; Jan. 13, 1984, 59-5066; Jan. 13, 1984, 59-5067; Jan. 13, 1984, 59-5068; Jan. 25, 1984, 59-13722; Jan. 26, 1984, 59-12972

Int. Cl.[4] B25J *17/02*

U.S. Cl. 414—735 **4 Claims**

1. A wrist device of an industrial robot, having a first drive shaft; a second drive shaft which concentrically encloses the first drive shaft; a third drive shaft which concentrically en-

closes the second drive shaft; a first box member connected to the third drive shaft and capable of rotating concentrically with the third drive shaft; a second box member which is supported rotatably by the first box member about an axis intersecting the axis of rotation of the first box member perpendicularly or obliquely; an output member which is supported rotatably by the second box member about an axis intersecting the axis of rotation of the second box member perpendicularly or obliquely and which is rotated by the first drive shaft; and a first bearing box which is disposed over the outer periphery of a gear of a first gear group constituting transmission systems of power to the second box member and the output member and which is mounted within an opening formed in the first box member, said opening being larger in diameter than the outer peripheral portion of said gear; a transmission shaft which is supported at one end thereof by said first box member and which intersects said third drive shaft perpendicularly or



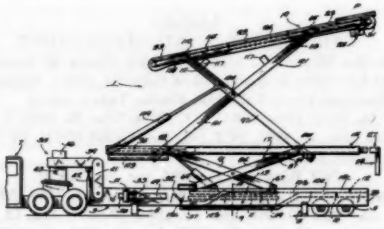
obliquely; said first gear group transmitting the rotation of the second shaft to said transmission shaft; said second box member being supported by the first box member rotatably at one end thereof and being open at the other end; a housing connected to both the opening at the other end of the second box member and said transmission shaft; said output member being supported rotatably by the second box member and intersecting the axis of said transmission shaft perpendicularly or obliquely; and a hollow shaft which is concentrically disposed outside said transmission shaft and which transmits the rotation of said first drive shaft to said output member through a second gear group, a bearing disposed over a gear of said second gear group, said gear of said second gear group being coupled to said hollow shaft, and a second bearing box supporting said bearing and mounted within the opening formed at the other end of said second box member, said opening being larger in diameter than the outer peripheral portion of said gear of said second gear group.

4,684,314

PIPE HANDLING APPARATUS

Royse I. Luth, Riverton, Wyo., assignor to Weatherford/Lamb, Inc., Houston, Tex.

Filed Sep. 24, 1984, Ser. No. 654,199
Int. Cl.[4] E21B *19/00*
U.S. Cl. 414—745 **11 Claims**



1. Apparatus for transferring pipe between a supply thereof and a location vertically and horizontally distant from the supply comprising:

carriage means,

conveyor means movably mounted on the carriage means for transporting a pipe lengthwise to a conveyor takeoff point, the conveyor means having body member means and endless belt means movably entrained around the body member means, the pipe to be transported receivably on the endless belt means and movable therewith, the conveyor means also having power means for moving the endless belt means,

lift means movably mounted on the carriage means for supporting the conveyor means and for expanding from a collapsed position to impart vertical motion to the conveyor means,

swivel means mounted on the carriage and to the lift means for swiveling the lift means and conveyor means,

transportable chassis means for supporting the carriage means, the lift means, the conveyor means, and the swivel means, and for nestingly receiving the collapsed lift means and conveyor means within the chassis so that the swivel means is held immobile when nested within the chassis,

a platform supporting the lift means and adapted to nestingly receive the conveyor means when the lift means is in the collapsed position, and

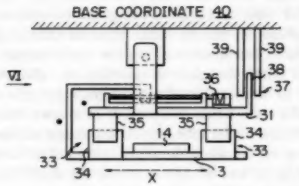
second lift means supported by the chassis for supporting the platform and for expanding from a collapsed position to impart vertical motion to the platform, the second lift means and platform being adapted to nest within the chassis when the second lift means is in the collapsed condition, so that the conveyor means and platform are nested within the chassis when the lift means and second lift means are in the collapsed condition.

4,684,315

FRICTIONLESS SUPPORTING APPARATUS

Kenji Sugishima, Kawasaki, and Hiroshi Yasuda, Yokohama, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Continuation of Ser. No. 537,626, Sep. 30, 1983, abandoned. This application Jan. 31, 1986, Ser. No. 824,930
Claims priority, application Japan, Sep. 30, 1982, 57-171243
Int. Cl.[4] B23Q *1/26*; G21K *5/10*
U.S. Cl. 414—749 **3 Claims**



1. A frictionless supporting apparatus used in a vacuum chamber of an electron beam exposure installation, said apparatus comprising:

a horizontally plane working table on which is placed a sample to be exposed by an electron beam, having magnetized horizontal portions on peripheries thereof;

first pairs of stationary magnetized members defining therebetween a vertical space into which said magnetized portions of the working table are inserted, such that magnetic repulsion between said magnetized horizontal portions of the working table and said first pairs of stationary magnetized members, frictionlessly hold said working table between said first pairs of stationary magnetized members;

said working table also having first magnetized vertical guide portions extending along a predetermined one horizontal direction;

a plane auxiliary table arranged substantially in parallel to said working table;

a means mounted on said auxiliary table for moving said

working table in said predetermined one horizontal direction with respect to said auxiliary table;

second pairs of magnetized members provided on said auxiliary table and defining therebetween a horizontal space into which said first magnetized vertical guide portions of the working table are inserted, such that magnetic repulsion between said first magnetized vertical guide portions of the working table and said second pairs of magnetized members of the auxiliary member frictionlessly guide said working table along said second pairs of magnetized members, when the working table is moved in said predetermined one horizontal direction with respect to said auxiliary table;

said auxiliary table having second magnetized vertical guide portions extending along in another horizontal direction perpendicular to said predetermined one horizontal direction;

a means mounted on a stationary base for moving said auxiliary table in said other horizontal direction;

third pairs of stationary magnetized members defining a horizontal space into which said second magnetized vertical guide portions of the auxiliary table are inserted, such that magnetic repulsion between said second magnetized vertical guide portions of the auxiliary table and said third pairs of stationary magnetized members frictionlessly guide said auxiliary table along said third pairs of stationary magnetized members, when the auxiliary table is moved in said other horizontal direction.

4,684,316

IMPROVEMENTS IN WIND TURBINE HAVING A WING-PROFILED DIFFUSOR

Jan Karlsson, Gothenburg, Sweden, assignor to KB Vindkraft i Göteborg, Gothenburg, Sweden

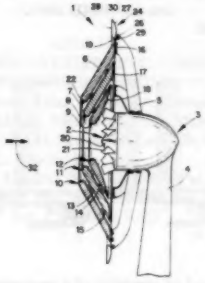
PCT No. PCT/SE83/00480, § 371 Date Aug. 29, 1984, § 102(e) Date Aug. 29, 1984, PCT Pub. No. WO84/02750, PCT Pub. Date Jul. 19, 1984

PCT Filed Dec. 27, 1983, Ser. No. 648,161

Claims priority, application Sweden, Dec. 30, 1982, 8207495

Int. Cl.⁴ F03D *1/04*

U.S. Cl. 415—2 A **3 Claims**



1. Wind turbine having a rotor comprising a hub and blades extending from said hub, an annular body positioned adjacent to said rotor concentric thereto and being formed of a plurality of concentric rings and having a front side comprising an inlet side for a flow of air and having an opposite back side comprising an outlet for the flow of air, said inlet side including an inlet opening which converges towards said rotor to accelerate air flowing into said inlet, said concentric rings each having an inner edge adjacent to said inlet opening, an outer portion of the front side of the annular body which has a form of a frustum of a cone the outer edge of the outermost one of said concentric rings forming the outer edge of the annular body and is positioned rearwards of said inner edges of said inlet side, an outer portion of the back side of the outermost concentric ring of said annular body having an outer edge connected to the outer edge of the front side outer portion of said annular body to form a sharp outer edge of the annular body, said back side having an inner portion positioned forwards of said sharp outer edge, the back side surfaces of said concentric rings of said annular body cooperating to form a convex shape which defines a hollow cone with a convex surface, the inner edge of said outermost concentric ring being curved and the inner edge of the innermost concentric ring being curved to define an overall rounded profile so that the cross-section in radial direction of the annular body corresponds substantially to a wing profile with the sharp outer edge of the annular body corresponding to the trailing edge of the wing profile, the rounded profile corresponding to the leading edge of the wing profile, the front side of the annular body corresponding to the flattened underside of the wing profile, and the back side of the annular body corresponding to the bowed upper side of the wing profile, and said blades of the rotor being positioned downstream the rounded profile.

4,684,317

HIGH-VACUUM MOLECULAR PUMP

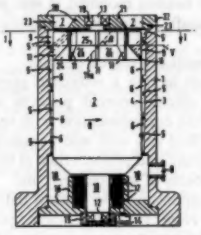
Waltherus J. T. H. Luijten, and Johannes J. E. Moonen, both of Almelo, Netherlands, assignors to Ultra-Centrifuge Nederland N.V., Almelo, Netherlands

Filed Nov. 13, 1984, Ser. No. 670,646

Claims priority, application Netherlands, Nov. 16, 1983, 8303927

Int. Cl.⁴ F04D *1/08*; F04B *5/00*

U.S. Cl. 415—73 **5 Claims**



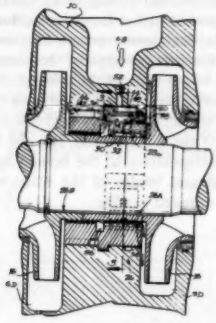
1. High-vacuum molecular pump comprising at least two coaxial elements mounted rotatably with respect to each other about an axis and at a small distance from each other, wherein a side of at least one of the elements positioned opposite a side of another element is provided with at least one helical groove, and wherein a pump space is present between these two sides of the elements, which pump space is in communication with a gas supply and a gas discharge, wherein near an end of the pair of elements a substantially annular gas supply chamber is present which is bounded by the elements, which annular gas supply chamber is in communication with the gas supply and with the pump space between the two elements, wherein the helical groove extends into the annular gas supply chamber, and wherein the elements which bound the annular gas supply chamber are so shaped that the annular gas supply chamber is relatively wide near the gas supply, but narrows downstream, characterized in that in the annular gas supply chamber are mounted blades which are attached to the side of that element which is located opposite the helical groove extending into the annular gas supply chamber, the blades making an angle with a surface perpendicular to the axis of rotation, which angle is in the range between a right angle and an angle which is less than a right angle, and wherein said helical groove extends into said supply chamber to a position adjacent the blades.

4,684,318

HYDROSTATIC BEARING FOR PUMPS AND THE LIKE

Johannes A. Mulders, Etten-Leur, Netherlands, assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 610,895, May 16, 1984, abandoned.
This application Nov. 25, 1985, Ser. No. 802,103
Int. Cl.[4] F04D *29/04*
U.S. Cl. 415—113 **1 Claim**



1. A centrifugal pump comprising:
a pump case including at least one pumping chamber therein;
a shaft rotatably mounted in said case;
a centrifugal impeller disposed in said chamber and supported by said shaft, said impeller being constructed and arranged for receiving product fluid from a suction inlet and moving said product fluid to a discharge outlet at an increased energy level in response to rotation of said shaft;
a hydrostatic bearing mounted in said pump case surrounding said shaft including a plurality of circumferential pockets;
an external auxiliary source of fluid;
passage means having a restricted portion communicating with said circumferential pockets, said passage means being in fluid communication with said external auxiliary source of fluid and with said pumping chamber arranged for conducting said product fluid at increased energy level to said pockets of said bearing; and
a pressure responsive flow control ball disposed for movement with respect to said restricted portion in said passage means, said ball having opposite sides thereof exposed respectively to said product fluid and said auxiliary source of fluid, said ball being movable in response to a predetermined pressure drop in said product fluid to permit flow of said auxiliary fluid to said pocket of said bearing.

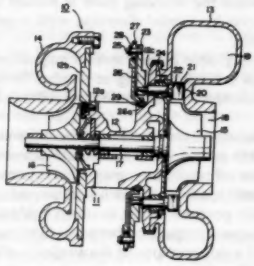
4,684,319

TURBOCHARGER WITH VARIABLE NOZZLE MECHANISM

Shoji Sasaki, Mishima, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jan. 28, 1986, Ser. No. 823,411
Claims priority, application Japan, Jan. 29, 1985, 60-9974[U]
Int. Cl.[4] F01D *17/16*
U.S. Cl. 415—164 **7 Claims**

1. Apparatus for variably controlling a turbine having a housing comprising:
a plurality of nozzle vanes adapted to be rotatably housed in said turbine housing;
a disk plate rotatably provided outside of said turbine housing, said disk plate consisting of a single integral plate;
rotation transmitting means including a plurality of shafts, each of said shafts attached to a nozzle vane, for operatively coupling said disk plate with said nozzle vanes so that the rotation of said disk plate is transmitted to said nozzle vanes; and
a center housing including:
a center housing main body having a turbine housing side, a compressor housing side, main bearings adapted for supporting a turbine shaft, for supporting said disk plate for rotation;
a first flange portion integral with said turbine housing side of said center housing main body, adapted to be fixed to a turbine housing, and having an outside diameter larger than an inner diameter of said disk plate; and



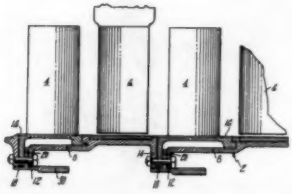
a second flange portion being separably fixed at one end to said compressor housing side of said center housing main body and being able to be fixed at a second end to a compressor housing;
said center housing main body having an outside diameter smaller than said inner diameter of said disk plate from the portion at which said disk plate is rotatably mounted up to the end portion at which said second flange portion is fixed.

4,684,320

AXIAL FLOW COMPRESSOR CASE

Cleon V. Kunz, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 681,346, Dec. 13, 1984, abandoned.
This application Aug. 11, 1986, Ser. No. 894,071
Int. Cl.[4] F04D *29/52*
U.S. Cl. 415—190 **6 Claims**



1. In the method of assembly of a compressor case in which the case includes at least two casing rings each having a flange at each end and each having a row of vanes secured thereto, said vanes having shrouds at their outer ends and the shrouds having a flange at one edge for engagement with and attachment to one of the flanges on the casing ring and a T-ring having a flange to overlie the outer edges of the contacting flanges in the shrouds and casing and a stem portion on the T-ring to engage axially against the flanges on the shrouds, the steps of
positioning the flanges on the shrouds of a row of vanes against the outer face of one of the flanges in the casing rings such that the shrouds are substantially in alignment with the ring and extending axially therefrom to form an extention of said ring,
positioning the T-ring with its stem portion against the flanges on the shrouds and using the flange on the T-ring

to align the ring and shrouds by engagement with the periphery of said ring flange and shroud flanges,

bolting the shroud flanges and casing ring and T-ring together as a subassembly for a compressor case,

sliding the adjacent casing ring over the shrouds of the subassembly to place the the flange on the casing ring at the end of the adjacent ring remote from the shroud flange attachment flange against the opposite side of the stem portion of the T-ring engaging the shroud flanges, the shrouds having axial flanges on the edges remote from the bolting flanges and the adjacent casing ring having an axial slot therein to receive said flanges on the shrouds on the subassembly such that the axial flanges and axial slot are interengaging when the adjacent casing ring is assembled in position over the shrouds of the subassembly, and

bolting the adjacent casing ring to the subassembly by bolts passing through the bolted flanges of the subassembly and the flange on the adjacent casing ring.

4. A compressor case construction including a plurality of casing rings each having flanges at each end by which the rings may be secured together to form the compressor case

a row of vanes supported by each ring, the vanes having outer shrouds by which the vanes are supported on the casing ring, each shroud having an outwardly extending flange at one edge engaging laterally with the flange at one end of the casing and with the shrouds extending axially beyond said casing ring to form an extention of said casing ring

an attachment T-ring surrounding the row of vanes and having a stem portion positioned on the side of shroud flanges opposite the casing ring and secured to the flanges on the casing ring by bolts extending through said casing flange, shroud flanges and T-ring, said casing ring, shrouds and T-ring when bolted together forming a subassembly for a compressor case and

each casing ring being of such a width as to space the adjacent rows of vanes apart and to overlie the shrouds on the row of vanes on an adjacent casing ring such that flange on said next adjacent casing ring remote from the flange to which the shroud flanges are attached engages with and is piloted by said T-ring, said adjacent casing ring being bolted to said T-ring and to the spacer ring to which the T-ring and shrouds are attached in the subassembly.

4,684,321

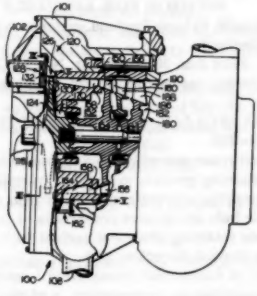
HEAT RECOVERY SYSTEM INCLUDING A DUAL PRESSURE TURBINE

John R. Barrett, Mesa, Ariz.; Richard A. Cemenska, Edelstein, Ill.; John R. Gladden, Metamora, Ill.; Mark D. Moeckel, Peoria, Ill., and Philip H. Schneider, La Jolla, Calif., assignors to Caterpillar Inc., Peoria, Ill.

Division of Ser. No. 671,262, Nov. 14, 1984, Pat. No. 4,586,338. This application Dec. 9, 1985, Ser. No. 807,407

Int. Cl.[4] F01D *9/02*

U.S. Cl. 415—202 **15 Claims**



1. A dual pressure turbine adapted to generate an output force in response to the flow of a gas therethrough, comprising:

a housing having a first inlet port adapted for connection with a source of gas at a preselected high pressure level and superheated to a preselected high temperature;

a first stage defined in the housing and including a first rotor chamber, a first rotor having a plurality of blades secured around the periphery and being rotatably positioned in the first rotor chamber, a first plurality of nozzles interconnecting the first inlet port and the first rotor chamber adjacent a preselected number of blades of the first plurality of blades, and an outlet passage connected with the first rotor chamber adjacent at least the preselected number of blades;

a second stage defined in the housing and including a second rotor chamber, a second rotor having a second plurality of blades secured around the periphery and being rotatably positioned in the second rotor chamber and drivingly connected to the first rotor, a second plurality of nozzles opening into the second rotor chamber adjacent the second plurality of blades and being evenly spaced thereabout, and an outlet passage connected to the second rotor chamber;

a second inlet port located in the housing and being adapted for connection with a second source of gas at a preselected pressure lower than the preselected high pressure and superheated to a temperature lower than the preselected high temperature;

first passage means for connecting the second inlet port with the second plurality of nozzles so that the gas from the second source of gas is substantially axially directed to the second plurality of nozzles at a predetermined velocity, said first passage means includes an arcuate slot defined in the housing connecting the second inlet port with the second plurality of nozzles;

second passage means for connecting the outlet passage of the first stage with the second plurality of nozzles so that the gas from the outlet passage of the first stage is substantially axially directed to the second plurality of nozzles at substantially the same velocity as the predetermined velocity of the gas from the second source, said second passage means includes a second arcuate slot defined in the housing connects the outlet passage from the first stage with the second plurality of nozzles, said first and second arcuate slots being adapted to direct the gas to the second plurality of nozzles in substantially an axial direction and wherein a cross sectional area of the first arcuate slot is progressively decreased between the second inlet port and the second plurality of nozzles so that the velocity of the gas from the second inlet port is increased to substantially the predetermined velocity, and a cross sectional area of the second arcuated slot is inceased between the outlet passage of the first stage and second plurality of nozzles so that the velocity of the gas from the first stage is decreased to substantially the predetermined velocity.

4,684,322

COOLED TURBINE BLADE

Rodney J. Clifford, Gloucestershire, and Ian J. Charters, Bristol, both of England, assignors to Rolls-Royce plc, England

Filed Oct. 26, 1982, Ser. No. 445,072

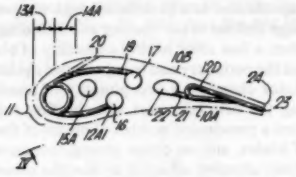
Claims priority, application United Kingdom, Oct. 31, 1981, 8132879

Int. Cl.[4] B63H *1/14*

U.S. Cl. 416—95 **10 Claims**

1. A turbine blade comprising an aerofoil body, at least one cooling air passage extending through the body in a helical path such that the passage passes alternately between a first and a second region of the blade, wherein the second region is one which, during operation, tends to have a general temperature lower than that of the first region and wherein the passage

and the second region are so arranged that during operation the cooling air in the passage becomes heated by the first



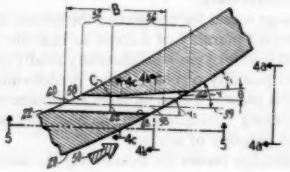
region to a temperature greater than that of the second region, so that the second region receives heat from the cooling air.

4,684,323

FILM COOLING PASSAGES WITH CURVED CORNERS

Robert E. Field, Tequesta, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 23, 1985, Ser. No. 812,104
Int. Cl.[4] F01D *5/18*
U.S. Cl. 416—97 R **14 Claims**



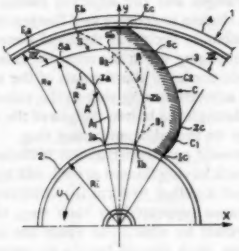
1. A cooled wall having an outer surface adapted to be exposed to a hot gas stream flowing in a downstream direction over said outer surface, and an inner surface adapted to define a portion of a coolant compartment for receiving coolant therein under pressure, a coolant passage within said wall, said passage having an outlet over which the hot gas flows in said downstream direction and including a metering section in series flow relation with a diffusing section, said diffusing section having an inlet and outlet, said metering section adapted to receive a flow of coolant from the coolant compartment and to control the rate of flow of coolant fluid through said passage, said diffusing section including an upstream surface spaced apart from and facing a downstream surface, said first and second surfaces being parallel to each other or diverging from each other toward said outer surface and intersecting said outer surface of said wall at a shallow angle to define said outlet of said coolant passage, said outer surface extending downstream of said passage outlet, said coolant passage being oriented to direct the flow of coolant from said passage outlet such that is has a component of velocity in the downstream direction and forms a film of coolant over said outer surface downstream of said passage outlet, said first surface forming an upstream edge of said passage outlet where it intersects with said outer wall and said second surface defining a downstream edge of said passage outlet where it intersects with said outer wall, said diffusing section including side surfaces facing each other, interconnecting said upstream and downstream surfaces and diverging from each other toward the outlet of said diffusing section, each of said side surfaces blending along substantially its full length with said downstream surface as a smooth curve having a diameter on the order of magnitude of the distance between said upstream and downstream surfaces at the location of said blending.

4,684,324

AXIAL FAN, PARTICULARLY FOR MOTOR VEHICLES

Alessandro Perosino, Turin, Italy, assignor to Gate S.p.A., Asti, Italy

Filed May 1, 1986, Ser. No. 858,331
Claims priority, application Italy, Aug. 2, 1985, 53676/85
Int. Cl.[4] F04D *29/38*
U.S. Cl. 416—189 **2 Claims**



1. Axial fan, particularly for motor vehicles, comprising a central hub, a plurality of blades which extend from the hub towards the periphery and the radially outermost parts of which are curved forwardly in the sense of rotation of the fan, and an outer coaxial ring having an inner cylindrical surface to which the peripheral ends of the blades are fixed, characterised in that the median line (B) of each blade (3), which is obtained by joining the points (S_b) that are circumferentially equidistant from the leading edge (A) and the trailing edge (C) of the blade in the axial projection of the blade profile, has a first, radially-innermost curved portion (B_1) which extends from its point of origin (I_b) on the hub (2) and is directed rearwardly of the radial line (I_b, Z_b) passing through the point of origin itself, and a second, radially-outermost curved portion (B_2) joined to the first portion and extending forwardly of the radial line to the periphery (E_b) connected to the outer coaxial ring (4) of the fan, the radial extent of the first portion being between 25% and 50% of the overall radial extent of the blade defined by the radial distance between the periphery (R_i) of the hub (2) and the inner cylindrical surface (R_e) of the outer coaxial ring (4) and further characterised in that the median line (B), from its point of origin (I_b) on the hub to its end point (E_b) on the outer ring, is within an angular interval no greater than half the distance between two adjacent blades, the profile of the blade also being characterised in that its circular thickness increases progressively from the interior to the exterior and in that the pitch setting angle of the profile decreases progressively from the interior to the exterior.

4,684,325

TURBOMACHINE ROTOR BLADE FIXINGS AND METHOD FOR ASSEMBLY

Hubert E. Arnold, Bristol, England, assignor to Rolls-Royce plc, London, England

Filed Jan. 30, 1986, Ser. No. 824,271
Claims priority, application United Kingdom, Feb. 12, 1985, 8503607
Int. Cl.[4] F01D *5/30, 5/32;* B21K *3/04;* B23P *15/04*
U.S. Cl. 416—215 **4 Claims**

1. A bladed rotor assembly for a turbomachine comprising:

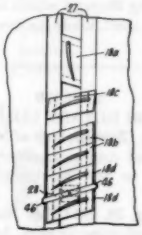
a blade retaining groove, generally dovetailed in cross-section, extending circumferentially around a periphery of a rotatable hub, the groove comprising at least one continuous blade retaining abutment surface facing in a generally radially inward direction; and

a plurality of blades each comprising a root portion generally dovetailed in cross-section, a platform of generally rhombic shape having two side abutment faces for contact with side abutment faces of adjacent blades, and an aero-

foil, the root portion comprising at least one generally radially outward facing abutment surface adapted to engage a corresponding blade retaining abutment surface in the retaining groove to thereby retain the blade in the groove;

wherein each blade root portion is shaped in relation to the blade retaining groove to provide a clearance therebetween to facilitate twisting of the blade with respect to the hub.

3. A method of assembling a turbomachine rotor assembly which includes a blade retaining groove, generally dovetailed in cross-section, extending circumferentially around a periphery of a rotatable hub, the groove comprising at least one continuous blade retaining abutment surface facing in a generally radially inward direction; and a plurality of blades each comprising a root portion generally dovetailed in cross-section, a platform of generally rhombic shape having two side abutment faces for contact with side abutment faces of adja-



cent blades, and an aerofoil, the root portion including at least one generally radially outward facing abutment surface adapted to engage a corresponding blade retaining abutment surface in the retaining groove to thereby retain the blade in the groove, each blade root portion being shaped in relation to the blade retaining groove so as to provide a clearance therebetween to facilitate twisting of the blade with respect to the hub; the method comprising the steps of:

inserting each blade into the retaining groove with the side abutment faces extending in a generally circumferential direction;

twisting each blade relative to the hub after insertion to a predetermined operating position and further twisting it by taking up at least some of the clearance between the blade root portion and the blade retaining groove to thereby reduce the circumferential space taken up by the platform; and

when all the blades are inserted in the groove, twisting each blade back to its operating position.

4,684,326

BLADED ROTOR ASSEMBLY, AND METHOD OF FORMING SAME

Mark E. Wassell, Bloomfield, and John G. Mosimann, Ellington, both of Conn., assignors to Terry Corporation, Windsor, Conn.

Continuation-in-part of Ser. No. 408,228, Aug. 16, 1982, Pat. No. 4,482,296, which is a continuation of Ser. No. 321,338, Nov. 16, 1981, Pat. No. 4,482,297. This application Apr. 19, 1984, Ser. No. 602,066

Int. Cl.⁴ F01D *5/32*

U.S. Cl. 416—215 **6 Claims**

1. A bladed rotor assembly, for a turbine or the like, comprising:

a wheel;

said wheel having a periphery with a trough formed therein; and

a plurality of blades, each thereof having a root end; wherein

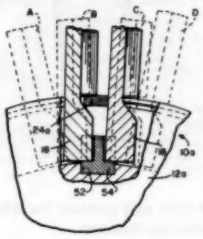
said trough has spaced-apart, confronting, wall surfaces;

said blades, of said plurality thereof, each have surfaces on opposite sides thereof interposed between, and engaged with, said confronting, wall surfaces;

at least one pair of said engaged side and wall surfaces has means cooperative for retaining said blades in said trough; and

said trough has means, at a given location on said periphery, defining an access, for accommodating selective insertion and removal of said root ends therethrough, for entry of said root ends into, and withdrawal of said root ends from, said trough; and further including

single locking means, in said trough, and obstructing said access, for preventing movement of said root ends through said access; and



packers only of one-piece construction, interposed between said blades of said plurality thereof, for uniformly setting apart, and for closing off said trough between, said blades; wherein

said wall surfaces and said packers have mutually complementary means which cooperatively (a) accommodate a slidable engagement of said packers with said wall surfaces, in an attitude substantially perpendicular to said wall surfaces in which said packers bridge across only an uppermost portion of said trough, and (b) retain said packers against disengagement from said wall surfaces;

all blades of said plurality thereof are identical; and

said locking means is integrally coupled to one of said packers.

4,684,327

WASHING MACHINE FLUID DISCHARGE MONITORING UNIT

Joseph A. Gentiluomo, 1456 Belmont Ave., Schenectady, N.Y. 12308

Continuation-in-part of Ser. No. 211,661, Dec. 1, 1980, abandoned. This application Jul. 19, 1982, Ser. No. 399,896

Int. Cl.⁴ F04B *49/00*

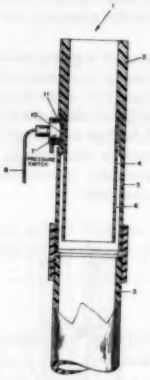
U.S. Cl. 417—38 **3 Claims**

1. A fluid discharge monitoring unit for use in conjunction with a washing machine and fluid receiving means, comprising:

(a) A fluid level sending unit functionally associated with said fluid receiving means for sensing fluid level therein; said fluid level sending unit includes a nozzle having a bottomless air chamber fixedly and totally disposed within said nozzle, and a pressure switch having its pressure port interconnected to said air chamber such that compressed air within said air chamber actuates said pressure switch when fluid rises to a predetermined level within said air chamber;

(b) and a control unit operatively associated with said fluid level sending unit; said control unit comprising a plug, a socket, and a manually resettable circuit breaker; said circuit breaker including coil contacts, auxiliary contacts, and a coil in series with said coil contacts; both coil contacts and auxilary contacts switch to the maintained off position when current through said coil exceeds a predetermined value to trip said circuit breaker, after

actuation of said pressure switch; said plug, socket, coil, coil contacts, and auxilary contacts being electrically



interconnected with said pressure switch to control the fluid level monitoring function.

4,684,328

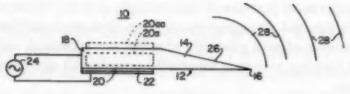
ACOUSTIC PUMP

Donald Murphy, Wellesley, Mass., assignor to Piezo Electric Products, Inc., Cambridge, Mass.

Continuation of Ser. No. 625,704, Jun. 28, 1984, abandoned. This application Jan. 22, 1986, Ser. No. 821,863

Int. Cl.[4] F04B *17/00*

U.S. Cl. 417—322 **47 Claims**



1. An ultrasonic pump comprising:

a resonant member having low internal damping and asymmetrically tapered to a thin edge;

a driver mounted on said resonant member; and

means for applying an alternating voltage to said driver in the resonant range of said resonant member for vibrating said resonant member in an open node line pattern which intesects with said thin edge.

4,684,329

CANNED MOTOR PUMP

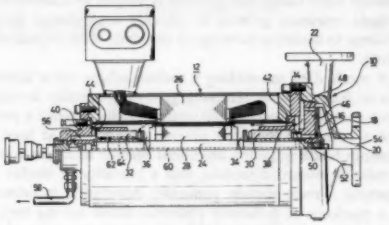
Kazuaki Hashimoto, Tokyo, Japan, assignor to Nikkiso Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 689,722, Jan. 8, 1985, abandoned. This application May 7, 1986, Ser. No. 861,735

Int. Cl.[4] F04B *17/00, 35/04*

U.S. Cl. 417—357 **2 Claims**

1. In a canned motor pump comprising a pump section and a canned motor section connected thereto, the pump and motor sections having a common shaft mounted in front and rear bearings disposed on opposite sides of a stator that surrounds a rotor carried by the shaft in the motor section, there being a gap between the stator and the rotor, the front bearing being disposed between the rotor and the pump section, means to divert a portion of the pumped liquid from the pump section and to recycle the same to a lower pressure zone of the pump section after lubricating the front bearing but without flowing through said gap, and means to divert another portion of the pumped liquid from the pump section through said gap to a lower pressure zone of the pump section after lubricating the rear bearing; the improvement in which the front bearing at its inner circumference has substantially higher resistance to liquid flow than the rear bearing at its inner circumference, and in



which the rear bearing at its inner circumference has at least one channel therealong through which liquid can readily flow during rotation of the shaft, while the front bearing is free from such a channel.

4,684,330

DRIVE FOR ROTARY COMPRESSOR

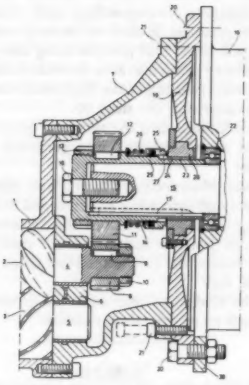
Lars Andersson; Rune Glanvall, both of Norrkoping; Kjell Ericson, Kolmarden, and Anders Lundberg, Norrkoping, all of Sweden, assignors to Stal Refrigeration AB, Norrkoping, Sweden

Filed Aug. 24, 1981, Ser. No. 295,581

Claims priority, application Sweden, Aug. 28, 1980, 8006019

Int. Cl.[4] F04B *17/00*

U.S. Cl. 417—360 **2 Claims**



1. In a rotary compressor, the combination of a compressor rotor having a shaft, a rotor housing enclosing said rotor, a motor having a drive shaft, means journalling said drive shaft only in the motor, a gear housing to which the rotor housing is fixedly connected, said rotor shaft and said drive shaft of the motor protruding into the gear housing, gear wheels fixedly connected to the respective shafts in the gear housing and through which said shafts engage each other, the gear housing having a wall part to which said motor is attached, means releasably connecting said wall part to the rest of the gear housing, whereby said wall part and motor are detachable as a unit from said rest of the gear housing, said wall part having an opening through which said drive shaft of the motor extends with a clearance space, sealing means for preventing a medium from forcing its way out of the gear housing through said clearance space, said gear wheels being accessible for disman-

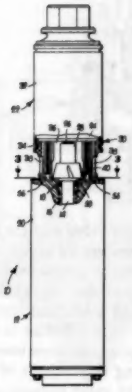
tling and assembly when said wall part and motor are detached from said restof the gear housing, an intermediate sleeve mounted on said drive shaft and slidable off one end thereof, said sleeve being dimensioned for insertion through said opening in said wall part, one of said gear wheels being mounted on the sleeve and slidable off one end thereof, means releasably securing said one gear wheel against sliding off the sleeve, and means releasably securing the sleeve against sliding off said drive shaft.

4,684,331

VANED SLINGER FOR PUMPS

Nyle D. LaGrange; Darryl M. Nielsen, both of Lenexa, and Charles F. Wheeler, Olathe, all of Kans., assignors to The Marley-Wylain Company, Mission Woods, Kans.

Filed Sep. 19, 1985, Ser. No. 778,447
Int. Cl.[4] F04B *47/06*
U.S. Cl. 417—366 **7 Claims**



1. In combination:

pump unit having a casing and at least one pump stage;

structure connected to said pump unit casing having walls defining a chamber adjacent said pump stage,

said chamber defining walls of said structure having an inlet opening for admitting fluid to said chamber;

an electric motor connected to said structure having rotatable output shaft means extending through said chamber and operably coupled to said pump stage for pumping of fluid from said chamber and in a direction generally along said shaft means toward said stage; and

a slinger mounted to said shaft means and disposed in said chamber for directing solid contaminants away from said pump unit and said motor,

said slinger including a projection extending radially outwardly in relation to the rotational axis of said shaft means,

said chamber defining walls of said structure having a fluid outlet spaced from said fluid inlet and communicating said chamber with areas external of said structure,

said fluid outlet lying substantially in a reference plane perpendicular to the rotational axis of said shaft means and generally extending through said projection of said slinger for enabling direct discharge of solid contaminants in directions substantially radially of said shaft means and thereby in directions generally transverse to the flow of fluids in said chamber toward said pump stage, for facilitating separation of solid contaminants from liquids to be pumped,

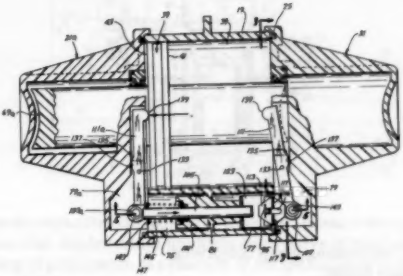
said fluid outlet lying beneath said inlet opening.

4,684,332

RATIO PUMP AND METHOD

E. Dale Hartley, Malibu, and F. Scott Hartley, Camarillo, both of Calif., assignors to Product Research and Development, Fullerton, Calif.

Filed Nov. 13, 1985, Ser. No. 797,620
Int. Cl.[4] F04B *11/00*
U.S. Cl. 417—397 **13 Claims**



1. A ratio pump for providing first and second liquid components in a desired ratio wherein the first liquid component is pressurized, said ratio pump comprising:

a motor including means defining a motor chamber, a reciprocable member reciprocable in the motor chamber, an inlet for admitting the first liquid component into the motor chamber to drive the reciprocable member with a predetermined volume of the first liquid component being used to drive the reciprocable member through at least one of its strokes, and exhaust for exhausting the first liquid component from the motor chamber, valve means for controlling the admission and exhaust of the first liquid component into and out of the motor chamber, respectively, and means for controlling the valve means so that the first liquid component can reciprocate the reciprocable member in the motor chamber;

a pump including means defining a pumping chamber, a reciprocable pumping member reciprocable in the pumping chamber, an inlet for admitting the second liquid component into the pumping chamber, an outlet for discharging the second liquid component from the pumping chamber with each delivery stroke of the pumping member pumping a predetermined volume of the second liquid component;

means for drivingly coupling the reciprocable members whereby the motor reciprocates the reciprocable pumping member;

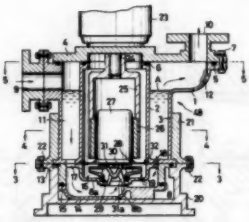
a receiver coupled to the exhaust of the motor to receive the first liquid component exhausted from the motor and the outlet of the pump to receive the second liquid component delivered from the pump whereby the receiver receives the first and second liquid components in the desired ratio; and

said controlling means including bistable spring means for operating the valve means, a movable member for driving the bistable spring means over center in both directions, and first and second pivotally mounted levers at opposite ends of the motor chamber and pivotable by the reciprocable member of the motor as it nears the end of each stroke for moving the movable member whereby the bistable spring means operates the valve means.

4,684,333
SELF-PRIMING PUMP

Norishige Hirakawa, Saitama; Kazuo Okada, and Kazuhiko Sato, both of Kawagoe, all of Japan, assignors to Iwaki Co., Ltd., Tokyo, Japan

Filed Jul. 2, 1986, Ser. No. 881,224
Claims priority, application Japan, Jul. 10, 1985, 60-151548
Int. Cl.[4] F04B *49/02;* F16K *24/00*
U.S. Cl. 417—420 12 Claims



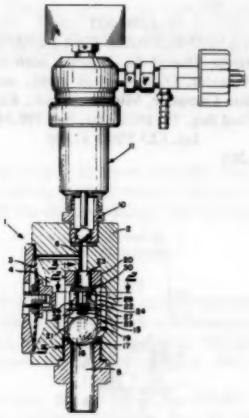
1. A self-priming pump comprising:
a pump casing;
an inlet port and an outlet port in the pump casing for a pump fluid;
an intake-side priming fluid chamber formed in the pump casing and communicating with the inlet port;
a discharge-side priming fluid chamber formed in the pump casing and communicating with the outlet port;
a pump chamber defined in the pump casing;
an impeller rotatably disposed in the pump chamber;
drive means for rotating the impeller, whereby the fluid is sucked in through the inlet port, circulated in a feeding direction, and discharged through the outlet port;
a partition member for dividing the intake-side priming fluid chamber from the discharge-side priming fluid chamber;
communication hole means bored through the partition member on a predetermined level, whereby the intake-side priming fluid chamber is connected to the discharge-side priming fluid chamber, said communication hole means serving to prevent, on the level thereof, a backflow of the fluid due to siphonage caused when a pumping operation is stopped, thereby keeping the surface level of a priming fluid in the intake- and discharge-side priming fluid chambers on the predetermined level;
a valve assembly provided corresponding to the communication hole means; and
a valve member provided in the valve assembly and movable between an open position where the intake- and discharge-side priming fluid chambers are allowed to communicate with each other by means of the communication hole means, and a closed position where the communication between the priming fluid chambers is cut off, said valve member being urged toward the open position,
said valve member being adapted to be moved, against the urging action, to the closed position to be held therein by the action of the pump fluid when subjected to a flow of the fluid in the feeding direction, and to be held in the open position when subjected to the backflow of the fluid.

4,684,334
INLET VALVE ASSEMBLY FOR PAINT SPRAYER

Eugene F. Gargas, Wellington, Ohio, assignor to The Wooster Brush Company, Wooster, Ohio

Filed Aug. 18, 1986, Ser. No. 897,585
Int. Cl.[4] F16K *15/04*
U.S. Cl. 417—568 17 Claims

7. A sprayer pump for a paint sprayer or the like comprising a pumping chamber having inlet and outlet openings, means for drawing fluid into said pumping chamber through said inlet opening and for discharging such fluid from said pumping chamber under pressure through said outlet opening, and inlet and outlet valve assemblies for respectively controlling the flow of fluid into said pumping chamber through said inlet opening and out through said outlet opening, said inlet valve assembly comprising a valve seat within said inlet opening, an inlet valve movable toward and away from said valve seat for respectively closing and opening said inlet opening, and adjustable stop means engageable by said inlet valve during opening of said inlet valve to limit the travel of said inlet valve away from said valve seat, said adjustable stop means being movable

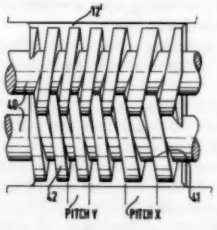


toward and away from said valve seat for respectively reducing and increasing the amount of travel of said inlet valve between the open and closed positions, said adjustable stop means including a spring holder threadedly mounted within said pumping chamber and a rebound spring carried by said holder, whereby rotation of said holder in opposite directions will cause said rebound spring to move toward and away from said valve seat for varying the amount of free travel of said inlet valve before said inlet valve engages said rebound spring during opening of said inlet valve.

4,684,335
PUMPS

Raymond A. L. Goodridge, Midsomer Norton, United Kingdom, assignor to Stothert & Pitt PLC, United Kingdom

Filed Oct. 24, 1985, Ser. No. 790,820
Claims priority, application United Kingdom, Oct. 24, 1984, 8426838
Int. Cl.[4] F04C *18/00*
U.S. Cl. 418—189 6 Claims



1. A screw displacement pump for comingled material of different phases such as gas phase and a liquid phase, the pump comprising a body defining a chamber, at least one inlet and at least one outlet for the admission of fluid to and discharge of fluid from the chamber, a plurality of intermeshing screw members mounted for rotation within the chamber for trans-

porting the comingled material from the inlet to the outlet, the threads of the intermeshing screw members being of opposite hand, wherein the pitch of the screw members at the outlet end thereof is smaller than the pitch of the screw members at the inlet end thereof to cause compression of gaseous material being transported, and wherein clearances are provided between the screw members and between the screw members and the walls of the chamber to allow sufficient leakage of the material towards the inlet, when the material is in the liquid phase, to avoid a liquid lock.

4,684,336

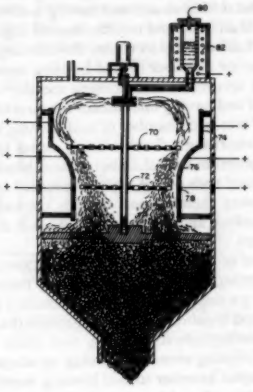
APPARATUS FOR BULK PRODUCTION OF CARBON FIBERS

Gregory R. Brotz, P.O. Box 1322, Sheboygan, Wis. 53081

Continuation-in-part of Ser. No. 691,150, Jan. 14, 1985, abandoned. This application Feb. 10, 1986, Ser. No. 828,228

Int. Cl.[4] B22F *9/00*

U.S. Cl. 425—8 **9 Claims**



1. An apparatus for spinning fibers comprising:

a generally cylindrical chamber having a top and bottom;

a material to be spun into fibers; and

a rotating basket spinner in said chamber disposed near the top of said chamber adapted to receive said material and to produce fiber filaments;

a first pole electrode contacting said rotating basket spinner;

at least one open generally cylindrical second pole electrode positioned concentrically to the sides of said chamber below said rotating basket spinner through the open area of which falls said fiber filaments; and

means to provide an electron plasma between said basket spinner through said first electrode and said second electrode in said chamber through which electron plasma said fibers pass, said plasma adapted to change the state of said fiber filaments.

4,684,337

DEVICE FOR POLARIZING FERROELECTRIC MATERIALS

Francois Bauer, Saint Louis, France, assignor to Deutsch-Französisches Forschungsinstitut Saint-Louis, Saint-Louis Cedex, France

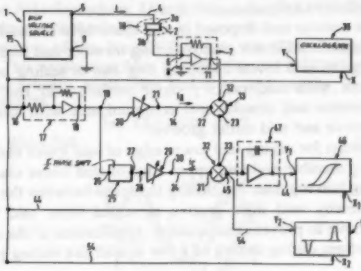
Division of Ser. No. 561,667, Dec. 15, 1983, Pat. No. 4,611,260. This application Jul. 30, 1986, Ser. No. 891,741

Claims priority, application France, Dec. 15, 1982, 82 21025

Int. Cl.[4] B29C *71/04;* **H04R** *17/00*

U.S. Cl. 425—135 **7 Claims**

1. A device for poling ferroelectric materials up to a predetermined polarization level, comprising an electric source for generating alternating voltages, application means to apply the alternating voltage to a material to be poled, varying means to alter both the level and frequency of the voltage applied and hence, to alter an electric field E applied to the material, subtracting means to substract the resistive component i_R as well



as the capacitive component i_C from the current i through the material, display means for displaying a curve of the hysteresis loop of polarization as a function of the applied electric field E, $P=F(E)$, and visualization means for showing a cyclic polarization current i_p as a function of the electric field, $i_p=f(E)$.

4,684,338

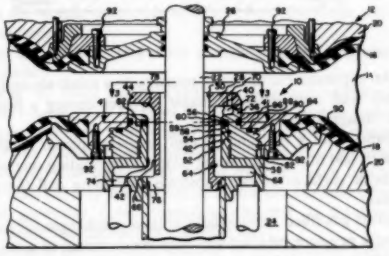
ROD GLAND AND HUB ASSEMBLY FOR TIRE CURING PRESS

Larry E. Steidl, Akron, and Christopher D. Stemm, Wadsworth, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jul. 3, 1986, Ser. No. 881,688

Int. Cl.[4] B29C *35/04*

U.S. Cl. 425—33 **7 Claims**



1. A center rod gland and hub assembly for a tire curing press comprising:

(a) a generally cylindrical rod gland having a central cylindrical opening for a control rod of said press and a radially outer cylindrical surface;

(b) a lower clamping ring member having a central opening for said rod gland with a radially inner cylindrical surface having substantially the same radius as the radius of said outer cylindrical surface of said rod gland;

(c) a lower clamping ring hub having a central opening for said rod gland positioned with an upper edge axially spaced from a lower edge of said lower clamping ring member on said rod gland and having a radially inner cylindrical surface of substantially the same radius as the radius of said outer cylindrical surface of said rod gland providing an annular space between said upper edge and said lower edge;

(d) said rod gland having an axially extending inlet groove and an axially extending outlet groove at circumferen-

tially spaced positions in said radially outer surface of said rod gland;

(e) said inlet groove and said outlet groove being in communication with a tire cavity for injecting a curing medium in a heated condition under pressure into said tire cavity and draining said curing medium in the cooled condition from said tire cavity;

(f) an annular seal disposed in said space between said lower edge of said lower clamping ring member and said upper edge of said lower clamping ring hub in sealing engagement with said radially outer surface said rod gland wherein said annular seal communicates with said inlet groove and said outlet groove;

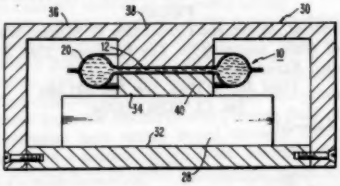
(g) means for urging said lower edge of said lower clamping ring member and said upper edge of said lower clamping ring hub together for closing the space between the edges whereby said inlet groove is sealed from said outlet groove to prevent temperature stratification of the curing medium during curing of a tire in said tire curing press.

4,684,339

GAS-LOADED PRESSURE DIAPHRAGM

Raschid J. Bezama, Mahopac, and Charles H. Perry, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 13, 1986, Ser. No. 873,906
Int. Cl.[4] B30B *5/02*
U.S. Cl. 425—389 **11 Claims**



1. An apparatus for applying pressure to a substrate-containing cell with two opposing major surfaces during a heating cycle, comprising;

a frame with a first and second opposing planar surfaces, with said first surface being adapted for holding one of the major surfaces of said substrate-containing cell thereon; and

a sealed gas-filled substantially hollow diaphragm for exerting a pressure substantially only proportional to a desired temperature including

an approximately planar hollow base with two opposing planar major surfaces substantially in contact thereacross at ambient temperature, and

a gas-filled substantially hollow container with a cross-section having at least one substantially circular area connected to communicate with said hollow base so that gas can flow therebetween,

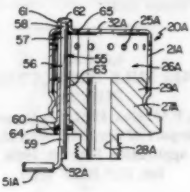
with said sealed gas-filled diaphragm being disposed with one of the two planar major surfaces of said base in contact with said second opposing planar surface of said frame, but being disposed so that said hollow container is not in contact with said frame, and with said diaphragm being disposed in relation to said frame and said cell so that when said diaphragm is heated to a desired temperature, the gas in said diaphragm expands and forces said two opposing planar major surfaces of said base apart to thereby exert a predetermined pressure that is substantially only proportional to said desired temperature on said substrate-containing cell.

4,684,340

BURNER CONSTRUCTION AND METHOD OF MAKING THE SAME

Jay R. Katchka, Cypress, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Aug. 23, 1985, Ser. No. 769,548
Int. Cl.[4] F23N *5/10*; **H01L** *35/02*
U.S. Cl. 431—80 **20 Claims**



1. In a burner construction having a cup-shaped housing member provided with a closed end having a substantially flat outer surface and an open end interconnected together by side wall means that has burner port means therethrough for issuing fuel from an interior chamber of said housing member, and an adapter member secured to said housing member to close said open end thereof and having inlet means for directing fuel from a source thereof into said chamber of said housing member, the improvement comprising a flame sensing means having a portion thereof disposed in said chamber of said housing member and having opposed ends one of which is secured to said closed end of said housing member and extends outwardly beyond said flat outer surface and the other of which is disposed outside said members.

11. In a method of making a burner construction comprising the steps of forming a cup-shaped housing member with a closed end having a substantially flat outer surface and an open end interconnected together by side wall means that has burner port means therethrough for issuing fuel from an interior chamber of said housing member, forming an adapter member, securing said adapter member to said housing member to close said open end thereof and have an inlet means thereof for directing fuel from a source thereof into said chamber of said housing member, forming a flame sensing means to have a portion thereof disposed in said chamber of said housing member and have opposed ends, securing one of said ends to said closed end of said housing member, and disposing the other of said ends outside said members, the improvement wherein said step of securing said one end of said flame sensing means to said closed end of said housing member comprises the step of extending said one end outwardly beyond said flat outer surface of said closed end of said housing member.

4,684,341

FUEL VAPORIZATION APPARATUS FOR COMBUSTOR

Hideo Kawamura; Yukio Yoshida, and Keiichi Yamashita, all of Fujisawa, Japan, assignors to Isuzu Motors, Ltd., Tokyo, Japan

Filed Jun. 23, 1986, Ser. No. 877,492
Int. Cl.[4] F23D *11/44*
U.S. Cl. 431—242 **18 Claims**

1. Liquid fuel combustion apparatus comprising:

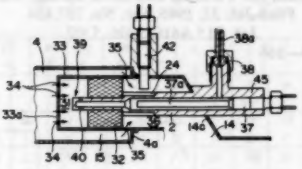
housing means defining a composite chamber;

a perforate wall separating said composite chamber into a vaporization chamber and a combustion chamber and distributing the flow of vapor therebetween;

intake pipe means providing air flow to said vaporization and combustion chambers;

a vaporization pipe comprising an inlet portion disposed in said combustion chamber and a discharge portion projecting into said vaporization chamber, said discharge portion defining a jet for discharging fuel into said vaporization chamber;

fuel supply means for feeding liquid fuel into said inlet portion of said vaporization pipe; and



igniter means disposed in said combustion chamber and for igniting fuel therein.

4,684,342

METHOD AND APPARATUS FOR THE THERMAL TREATMENT OF A BATCH OF RAW MATERIAL

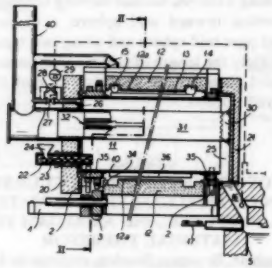
Siegfried Harcuba, Höhenstrasse 96, A-6020 Innsbruck, Austria

Filed Feb. 20, 1986, Ser. No. 832,121

Claims priority, application Austria, Feb. 22, 1985, 539/85

Int. Cl.[4] F27B *7/36*

U.S. Cl. 432—103 **5 Claims**



1. An apparatus for preheating a batch of glass-making raw material, comprising:

a casing composed of a thermally insulating material and having a cylindrical wall, a pair of end walls, and, adjacent one of said end walls, a chute formed in said cylindrical wall and leading to a glass-melting furnace;

an open-ended drum composed of a material of high thermal conductivity rotatable in said casing and having an end spaced from said one of said end walls for discharging glass-making raw material preheated in said drum into said chute for feeding to said glass-melting furnace, said drum having at least one heat-exchange surface;

seal means associated with said drum for preventing substantial gas flow therethrough into direct contact with said glass-making raw material therein;

a duct passing generally axially through said drum, secured to said casing and formed with at least one heat-exchange surface through which indirect heat exchange is effected between a heating gas axially traversing said duct and the glass-making raw material in said drum, said duct being provided at one end thereof with an inlet for said heating gas and at an opposite end thereof with an outlet for discharging said gas at least one of said surfaces being provided with projections promoting the indirect heat exchange;

feed means traversing the other of said walls and extending into said drum for depositing said glass-making raw material to be preheated therein; and

drive means connected to said drum for rotating same while said heating gas is passed through said duct to preheat the glass-making raw materials introduced into said drum through said drive means indirectly with said gas and discharge the preheated glass-making raw material into said chute.

4,684,343

IMPRESSION TRAY FOR A DENTATE HUMAN JAW

Josephus Schreinemakers, Oranje Nassaulaan 12, NL 6026 BX Maarheeze, Netherlands

Continuation of Ser. No. 679,732, Dec. 10, 1984, abandoned. This application May 9, 1986, Ser. No. 863,802

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1983, 3344774

Int. Cl.[4] A01C *9/00*

U.S. Cl. 433—214 **2 Claims**

1. A method of using a U-shaped, U-section, and imperforate tray having a buccal edge and an opposite lingual/palatal edge to take an impression of a human patient's jaw having a hard U-shaped dental arch, a mobile mucosa and a stationary mucosa to each side thereof, at least one tooth, and a linear action boundary between the two mucosae, the method comprising the steps of:

selecting from a set of anatomically differently dimensioned such trays the tray capable of fitting over the dental arch of the current patient with the buccal edge outside the arch and the lingual/palatal edge within the arch, with the tray generally uniformly spaced at most 5 mm from the arch, and with the buccal and lingual/palatal edges engaging the mobile mucosa generally beyond the linear action boundary;

filling the selected tray with a high-viscosity impression material;

pressing the filled and selected tray over said current patient's dental arch to press the buccal and lingual/palatal edges into tight engagement against the mobile mucosa past the linear action boundary with the tray generally uniformly spaced at most 5 mm from the arch to form between the tray and the dental arch a substantially closed and generally constant-section chamber hydraulically confining the impression material; and

compressing the confined material in the chamber against the dental arch by pressing the tray toward the arch while mobilizing the mobile mucosa to hydraulically press the confined material into formfit engagement with the stationary mucosa and without substantial leakage of the impression material from the chamber.

4,684,344

ELECTRICALLY POWERED AND HEATED ENDODONTIC SYRINGE

Charles E. Brockway, Palatine, and John J. Saeli, Wheaton, both of Ill., assignors to Nalge Company, Rochester, N.Y.

Filed Apr. 11, 1986, Ser. No. 850,469

Int. Cl.[4] A61C *5/02*

U.S. Cl. 433—81 **1 Claim**

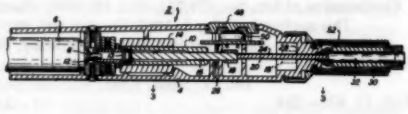
1. An endodontic syringe for injecting a heated thermoplastic material into a root canal cavity, including:

a drive motor mounted on a handpiece,

a plunger operatively connected to said drive motor for reversible axial translation into and out of a cartridge chamber defined by said handpiece,

a heating element disposed on said handpiece about said cartridge chamber,

a cartridge composed of aluminum or an aluminum alloy removably mounted within said cartridge chamber in axial alignment with said plunger, said cartridge defining an elongated cavity with a discharge orifice at the discharge



end of said cavity, said cartridge including a piston disposed in said cavity, said cartridge adapted to contain a quantity of said thermoplastic material within said cavity between said piston and said discharge orifice, and

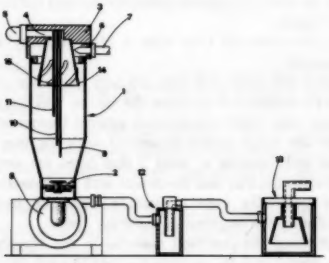
a hollow dispensing needle composed of aluminum or an aluminum alloy extending from said discharge orifice.

4,684,345

SPITTLE SEPARATION AND DISPOSAL DEVICE INCORPORATING A DRAINAGE PUMP, IN PARTICULAR FOR SUCTION EQUIPMENT USED IN DENTISTRY

Augusto Cattani, Parma, Italy, assignor to Officine Augusto Cattani & C.S.p.A., Italy

Filed Jan. 23, 1986, Ser. No. 821,613
Claims priority, application Italy, Jul. 31, 1985, 40079 A/85
Int. Cl.[4] A61C *17/04*
U.S. Cl. 433—92 **7 Claims**



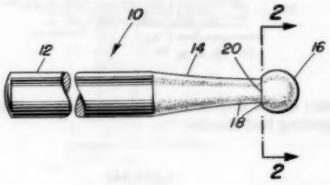
1. A spittle separation and disposal device incorporating a drainage pump, in particular for suction equipment used in dentistry, comprising a separator vessel (1), provided with a drain valve (2) which remains normally open at atmospheric pressure, and enclosed uppermost by a lid (3) having a first port (4) to which an air pump is connected and a second port (6) to which one or more tubes are connected, directly or indirectly, for the extraction of spittle from the mouth of the patient; and a drainage pump (8) located downstream of the drain valve that serves to dispose of the liquid contents of the separator vessel; wherein the drainage pump, which remains normally at standstill, is set in motion by start-control means whenever the liquid contents of the separator vessel rise to a prescribed level, and shut off by first stop-control means that relay a signal whenever the liquid contents of the vessel fall below the same prescribed level; and wherein a timer is employed by means of which to keep the drainage pump running for a given length of time following relay of the shutoff signal.

4,684,346

ENDODONTIC ACCESS BUR WITH EXTENDED DIAMOND COAT AND METHOD FOR USING

Howard Martin, 909 Pershing Dr., Silver Spring, Md. 20910

Filed Jul. 22, 1985, Ser. No. 757,434
Int. Cl.[4] A61C *3/06, 5/02*
U.S. Cl. 433—166 **1 Claim**



1. A dental instrument, comprising,

a shank portion;

a tapered portion integrally connected to said shank portion, a sphere integrally connected to said tapered portion opposite said shank portion; with said sphere being approximately 0.5 to 1.00 mm in diameter, said tapered portion being a curved surface curving inwardly from said shank portion toward said sphere; a diamond coating positioned over said sphere and along said tapered portion approximately the length of said tapered portion from said sphere, said diamond coating being at least 10 mm along said tapered portion.

4,684,347

METHOD OF PREVENTING THE OCCURRENCE OF CORROSION OF AMALGAM FILLING MATERIAL FOR DENTAL PURPOSES, AND AMALGAM FILLING MATERIAL THEREFOR

Georgios Palaghias, Bromma, Sweden, assignor to Landstingens Inkopscentral, LIC ek. forening, Solna, Sweden

Filed Mar. 26, 1986, Ser. No. 844,446
Int. Cl.[4] A61K *6/04*; C22C *7/00*
U.S. Cl. 433—228.1 **7 Claims**

1. A method of preventing the occurrence of corrosion of amalgam filling material for dental purposes, wherein a protective layer preventing continuous precipitation of metal from the amalgam filling and consisting of metal phosphates not easily dissolved in saliva, is caused to be formed along the exposed surfaces of the amalgam filling by initially incorporating phosphate ion donators in the amalgam filling material in the existing surroundings.

4,684,348

COMMUNICATIONS PROCESS AND APPARATUS

Grace M. Raynor, 24365 San Fernando Rd, #157, Newhall, Calif. 91321

Filed Jan. 9, 1986, Ser. No. 818,124
Int. Cl.[4] G09B *17/00*
U.S. Cl. 434—156 **25 Claims**

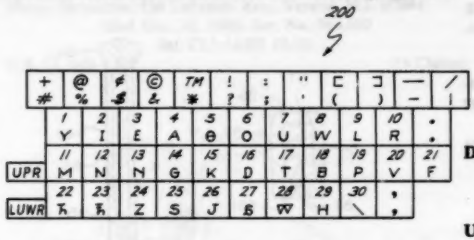
1. A communication apparatus comprising:

a keyboard having a pluarality of keys represented by the numerals "0" through "9", and including means for designating the position of a particular numeral if a multi-digit number is intended, the selection of one or more keys being indicative of a particular number,

each number being indicative of a verbalized component of a language in which at least some of the verbalized components comprise two or more aliphabetic characters representative of the verbalized component, and

means for outputting a serial string of numbers indicative of

a corresponding serial string of verbalized components formative of one or more words in said language, said



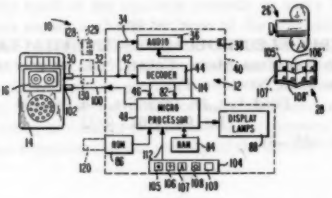
outputting means being operable upon selection of keys on said keyboard.

4,684,349

AUDIO-VISUAL TEACHING SYSTEM AND METHOD

Frank W. Ferguson, 2772 S. Randolph St., Arlington, Va. 22206, and Kenneth R. Herrity, Falls Church, Va., assignors to Frank Ferguson, Arlington, Va.

Continuation of Ser. No. 580,509, Feb. 15, 1984, abandoned. This application Jul. 28, 1986, Ser. No. 889,701
Int. Cl.[4] G09B 5/06
U.S. Cl. 434—308 **12 Claims**



1. An audio-visual system for teaching and testing students wherein the display of visual information is coordinated with related audio information in the form of voice narration to provide structured teaching of material and testing of students, and wherein the teaching and testing sequences are varied through branching and repetition in accordance with student response, comprising:

a magnetic lesson storage medium for receiving lesson plan information in the form of narration signals and encoded control data signals arranged in chapters, said narration signals providing predetermined audio information segments and said control data signals providing information concerning visual displays to be associated with specified audio information segments, the control data signals for each chapter establishing a predetermined lesson sequence for that chapter, providing correct response information for use in determining student progress, and providing prescriptions for specified student responses, whereby a predetermined lesson sequence can be varied in accordance with student response;

controller means including microprocessor means responsive to said lesson storage medium control data signals for operating the audio visual system in accordance with the lesson plan of said lesson storage medium;

key card means connected to said controller means for preventing unauthorized operation of said system, said key card means including a removable memory card carrying selected control data signals required for operations of said controller means;

visual display means including images corresponding to predetermined audio information segments and further including visible indexing means on each image for associating each image with at least one audio information segment;

signal means for manually selecting the visible indexing means of a desired image; and

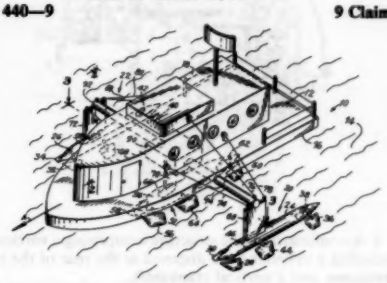
display means for displaying an identifier corresponding to the selected indexing means of a desired image, whereby a student can select the image required for a corresponding audio information segment.

4,684,350

WAVE-PROPELLED MARINE VESSEL

Daniel D. DeLima, 26 Coblentz Ave., Cascade, Port-of-Spain, Trinidad, Trinidad and Tobago

Filed Jul. 31, 1986, Ser. No. 892,593
Int. Cl.[4] B63H 19/02
U.S. Cl. 440—9 **9 Claims**



1. A wave-propelled marine vessel advanced by rising and falling water currents along an intended forward direction, comprising:

(a) an above-water superstructure having a main axis;

(b) a pair of submerged outer fin assemblies operatively connected to the superstructure and extending along longitudinal axes generally parallel to, and at opposite sides of, the main axis;

(c) a submerged central fin assembly operatively connected to the superstructure between the outer fin assemblies and having a longitudinal axis extending generally parallel to the longitudinal axes of the outer fin assemblies;

(d) each fin assembly having at least two fins mutually arranged in mirror-symmetrical relationship to its respective longitudinal axis;

(e) the fins of each assembly being movable in different circumferential directions in response to rising and falling water currents about respective fin axes which extend radially of the respective longitudinal axis and downwardly away from the superstructure;

(f) means for positioning the outer fin assemblies so that their longitudinal axes are on the order of integral wave lengths of a wave transversely apart from each other, whereby the fins on the outer fin assemblies substantially simultaneously move in one circumferential direction in response to rising water currents, and in an opposite circumferential direction in response to falling water currents;

(g) means for positioning the central fin assembly so that its longitudinal axis is on the order of a half-wave length of the wave transversely away from the longitudinal axes of the outer fin assemblies, whereby the fins on the central fin assembly substantially simultaneously move in said opposite circumferential direction in response to rising water currents, and in said one circumferential direction in response to falling water currents; and

(h) the fins of the outer fin assemblies having a combined surface area exposed to the water currents which is substantially equal to the combined surface area of the fins of the central fin assembly, whereupon the fins of the outer fin assemblies work in balanced reaction to the fins of the central fin assembly to propel the vessel along the forward direction.

4,684,351

OUTBOARD ENGINE STRUCTURE

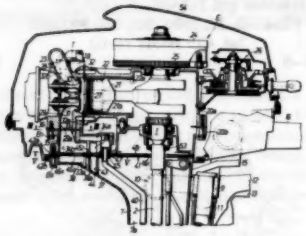
Yoshimi Watanabe, Asaka, and Kazuya Yamashita, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Shibuya, Japan

Filed Jul. 23, 1985, Ser. No. 758,050

Claims priority, application Japan, Jul. 26, 1984, 59-114157 [U]; Jul. 30, 1984, 59-159786; Jul. 30, 1984, 59-159787

Int. Cl.⁴ B63H *21/32*

U.S. Cl. 440—89 **12 Claims**



1. An outboard engine structure comprising a vertical engine including a cylinder head disposed at the rear of the engine, a crankcase, and a vertical crankshaft,

an extension case depending from the crankcase and including a hollow portion having a discharge port under a draft line,

a driving shaft for driving a propeller shaft, said driving shaft being coupled to said crankshaft and disposed in said hollow portion of said extension case,

an exhaust system for the engine which is open to said hollow portion and including an exhaust passage block separately formed from and interposed and coupled between said cylinder head and said extension case, said block having upper and lower surfaces and being secured in position by mounting said upper and lower surfaces respectively against a lower surface of the cylinder head and an upper surface of the extension case at a position remote from the crankcase, said cylinder head having an exhaust port, said exhaust passage block having an exhaust passage in communication with said exhaust port, said extension case having a discharge passage in communication with said exhaust passage and with said hollow portion.

4,684,352

METHOD FOR PRODUCING A COMPOSITE SPARK PLUG CENTER ELECTRODE

Ronnie W. Clark, Ottawa Lake, Mich., and Dale P. Ameling, Bowling Green, Ohio, assignors to Champion Spark Plug Company, Toledo, Ohio

Continuation-in-part of Ser. No. 710,341, Mar. 11, 1985. This application Jan. 13, 1986, Ser. No. 817,698

Int. Cl.⁴ H01T *21/02*

U.S. Cl. 445—7 **3 Claims**

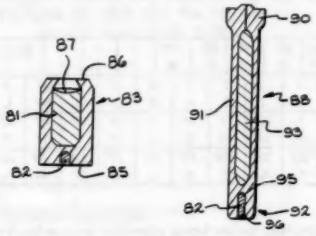
1. A method for producing a composite spark plug center electrode blank comprising the steps of:

a. forming a composite billet comprising a cup of a corrosion-resistant metal defining a cavity at least partially filled with a material having a high thermal conductivity, said cup having a closed end with an exterior surface defining a hole;

b. positioning a cylindrical wire insert of one of a precious and semi-precious metal into the hole;

c. pressing between said billet and said insert to retain said insert in the hole, wherein said insert is completely retained within the hole and is recessed from said exterior cup surface prior to extrusion; and

d. extruding at least a portion of the composite billet closed end first through an extrusion orifice, whereby a center electrode blank having an inner core of a high thermal conductivity material surrounded by an outer sheath of a corrosion-resistant material is formed, the blank having an



extruded tip end having at least a portion of the insert retained therein and having an unextruded terminal end.

4,684,353

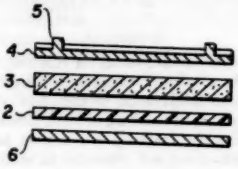
FLEXIBLE ELECTROLUMINESCENT FILM LAMINATE

Antonio S. deSouza, Mercer County, N.J., assignor to Dunmore Corporation, Newtown, Pa.

Filed Aug. 19, 1985, Ser. No. 766,443

Int. Cl.⁴ H01J *9/12*

U.S. Cl. 445—51 **16 Claims**



1. The method of producing a thin flexible electroluminescent element which comprises the steps of:

releaseably mounting on a carrier web comprised of a relatively thick flexible plastic film a preformed thin plastic base film,

thoroughly and uniformly dispersing in a thermoplastic resin matrix particles of an electroluminescent phosphor,

depositing the obtained dispersion as a coating layer on the exposed upper surface of the mounted base film,

bonding the phosphor-containing resin coating to the mounted base film by passing the thus coated film and carrier web through calendering rollers under pressure and at elevated temperature;

with or without first stripping the carrier web from the coated base film, directly sputtering on the exposed surface of the phosphor-containing resin matrix a thin transparent layer of electrical conducting material to serve as a front electrode;

applying to a selected portion of the transparent front electrode an electrical connection terminal formed of a metal having high electrical conductivity;

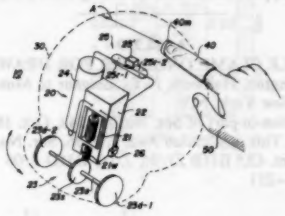
and, after stripping the carrier web from the base film, applying to one or more discrete areas of the exposed underside the base film, a metal facing of high electrical conductivity to serve as one or more back electrodes.

4,684,354

APPENDAGE OPERATED TOY

Henry Orenstein, 136 Lakeside Ave., Verona, N.J. 07044

Filed Dec. 23, 1983, Ser. No. 564,692
Int. Cl.[4] A63H *33/26*
U.S. Cl. 446—130 14 Claims



1. The method of simulating magical remote control over a device which comprises the steps of:

incorporating into the device a magnetic switch including a pair of longitudnally extending reeds which are held in a closed or open position by an associated auxiliary magnet opposite both of said reeds; and

including a magnet in the tip of a simulated finger which can be placed upon the finger of an operator so that movement of the hand of the operator towards or away from the object causes a change in state of the magnetic switch therein, which change of state is retained until a subsequent pass is made with the hand including the finger appendage with the magnet;

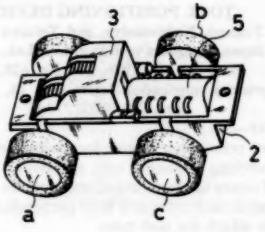
thereby to create the effect of magical operation of the device by movement of the hand of the operator with the finger appendage to the vicinity of the device.

4,684,355

AUTOMOBILE HAVING SELECTIVE DRIVE WHEELS

Shigeki Urakawa, Tokyo, and Noriyuki Inomata, Nagareyama, both of Japan, assignors to Takara Co., Ltd., Tokyo, Japan

Filed Jul. 1, 1986, Ser. No. 880,693
Int. Cl.[4] A63H *29/00*
U.S. Cl. 446—464 14 Claims



1. A toy automobile having selective drive wheels, comprising:

a body;

a chassis having front and rear spaces, which is detachably mounted to the body;

a pair of front wheels which are rotatably mounted to the chassis through either a front wheel windup spring drive unit or a first freewheel holder, which is detachably arranged in the front space of the chassis; and

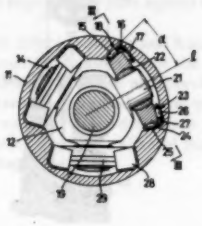
a pair of rear wheels which are rotatably mounted to the chassis through either a rear wheel windup spring drive unit or a second freewheel holder of the same type as the first freewheel holder, which is detachably arranged in the rear space of the chassis, whereby a selection between front wheel drive, rear wheel drive, four-wheel dirve or four-freewheel is made possible.

4,684,356

ROLLER BEARING ASSEMBLIES FOR A HOMOKINETIC UNIVERSAL JOINT

Kei Kimata, Aichi; Masahiro Kato, and Ko Shibata, both of Iwata, all of Japan, assignors to NTN Toyo Bearing Co., Ltd., Osaka, Japan

Filed May 1, 1986, Ser. No. 858,145
Claims priority, application Japan, Jun. 17, 1985, 60-132820
Int. Cl.[4] F16D *3/20*
U.S. Cl. 464—111 4 Claims



1. A homokinetic universal joint comprising:

a tripod member having three trunnions projecting radially and equally angularly spaced around its axis;

an outer member formed in its inner surface with three track grooves extending axially and equally angularly spaced around its axis;

said tripod member being disposed in said outer member with said trunnions received in said respective track grooves in said outer member;

a plurality of bearing assemblies each for said each trunnion on said tripod member, each said bearing assembly comprising a block member mounted on said trunnion so as to be slidable, tiltable and pivotable, two rows of rolling elements mounted at each side of said track groove, and a pair of retainers each for retaining said two rows of rolling elements,

each of said track grooves having a pair of side faces and a base face, said side faces being inclined so that said track groove will be narrowed toward the inlet thereof, said each track groove being formed at each side thereof with a pair of linear rolling surfaces extending in a direction parallel to the axis of said outer member, one of said rolling surfaces being formed on said side face and the other being formed on said base face near the corner of said track groove;

said retainer being bent around the corner corresponding to the corner between the side face and the base face of said track groove;

said rolling elements being adapted to roll between said outer member and said block member on said rolling surfaces on said outer member.

4,684,357

TIMING CHAIN RETRACTOR AND LOCK

Buddy D. Hooper, Rte. 2, Box 21, Hastings, Okla. 73548

Filed Nov. 14, 1985, Ser. No. 798,002
Int. Cl.[4] F16H *7/08*
U.S. Cl. 474—101 9 Claims

1. Apparatus useful with an overhead cam internal combustion engine having an engine head, a timing chain tensioner piston and at least one cylinder, said apparatus being used for retracting and tensioning a timing chain or belt of said overhead cam internal combustion engine after removal of the engine head, the apparatus acting to prevent dislodgement of the timing chain tensioner piston, the engine having an engine

block with at least two front head bolt holes formed therein, which bolt holes normally receive head bolts to maintain the engine head on the engine block, the engine further having a cam sprocket and a crankshaft sprocket mounted thereon and about which sprockets the timing chain or belt normally is carried, comprising:

a frame member having mounting slots for receiving the head bolts therethrough into the bolt holes in the engine block to mount the frame member to the engine block after removal of the engine head, the frame member having a first side and a second side, the first side facing the normal position of the timing chain and the second side facing the pistons of the engine, the second side having a concave recess formed therein which allows clearance of that cylinder nearmost the frame member to allow engine revolutions; and,

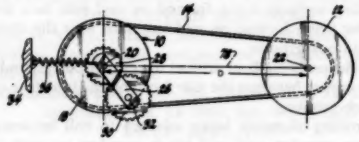
means carried by the frame member for adjustably mounting the cam sprocket in a vertical direction to allow tensioning of the timing chain or belt on the cam sprocket and crankshaft sprocket while retaining the chain tensioner piston in position.

4,684,358

CONTINUOUSLY VARIABLE TRANSMISSION AND CONTROL

Hamid Vahabzadeh, Rochester Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 3, 1986, Ser. No. 881,789
Int. Cl.[4] F16H *7/00*
U.S. Cl. 474—148 **2 Claims**



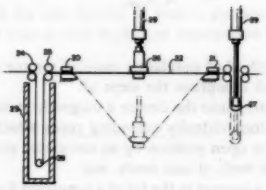
1. A continuously variable drive mechanism and torque loading mechanism comprising; a variable diameter V-groove pulley having at least one movable sheave; a second V-groove pulley; a flexible torque transmitting torque between said V-groove pulleys; a first gear member mounted on said variable diameter V-groove pulley for rotation therewith; first rotary support means for rotatably supporting said first gear member and said variable diameter V-groove pulley; a second gear member disposed in torque transmitting relation with said first gear member; stationary rotary support means for rotatably supporting said second gear member; link means connecting said first rotary support means and said stationary rotary support means for permitting said first rotary support means to pivot about said stationary rotary support means in response to the torque being transmitted in said flexible torque transmitting means to establish the squeeze force in the flexible torque transmitting means and to control the center distance between the pulleys; and force transmitting means operatively connected with said link means for imposing a force thereon which establishes the minimum torque transmitting requirement for said flexible torque transmitting means prior to pivoting of said first rotary support about said stationary rotary support.

4,684,359

MOVABLE CLAMP ORIENTER FOR DRAW TAPE

Fox J. Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 789,242, Oct. 18, 1985, abandoned. This application Aug. 7, 1986, Ser. No. 894,163
Int. Cl.[4] B31B *23/86, 1/90*; B31D *1/06*
U.S. Cl. 493—211 **10 Claims**



1. Apparatus for forming a thermoplastic draw tape having thick and wide end portions with a relatively thin and narrow central portion between said end portions, comprising:

means for feeding thermoplastic tape along a path of travel;

a pair of stationary clamps spaced along the path of travel of the thermoplastic tape for clamping the tape;

a movable clamp positioned along the path of travel of the thermoplastic tape intermediate said pair of stationary clamps for clamping the tape, each of said clamps having a clamping length equal to the length of unstretched end portions to be formed in the thermoplastic draw tape; and

means for stretching the thermoplastic tape between the unstretched end portions by moving said movable clamp away from said stationary clamps to produce said relatively thin and narrow central portions in the thermoplastic draw tape between the unstretched end portions.

4,684,360

TOOL POSITIONING DEVICE

Masateru Tokuno, Nishinomiya, and Tetsuya Sawada, Kyoto, both of Japan, assignors to Rengo Co., Ltd., Osaka, Japan

Filed Feb. 13, 1986, Ser. No. 828,917
Claims priority, application Japan, Feb. 14, 1985, 60-28092
Int. Cl.[4] B05B *1/14*
U.S. Cl. 493—367 **13 Claims**

1. A tool positioning device for positioning a plurality of tools for working a running web, said device comprising;

a pair of rotary shafts arranged one over the other so as to be parallel to each other and to be perpendicular to the direction in which the web runs;

a plurality of tool heads mounted on each of said rotary shafts so as to be slidable axially thereon and turn together with the rotary shaft;

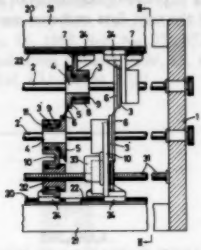
said tool heads each being adapted to carry one of the tools;

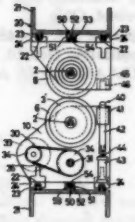
a plurality of head supporting plates for supporting said tool heads mounted on one of said rotary shafts so as to allow said tool heads to turn together with said respective rotary shafts;

a plurality of position adjusting members for supporting said tool heads mounted on the other of said rotary shafts so as to allow said tool heads to turn together with said other of the rotary shafts;

a transfer means for moving said position adjusting members independently from said head supporting plates along said rotary shaft; and

a plurality of coupling means each for coupling together an opposed pair formed by one of said head supporting plates and one of said position adjusting members, so that said





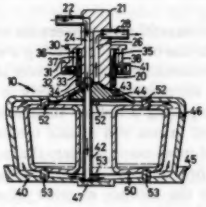
opposed pair will be moved together by said transfer means along said rotary shafts only when said coupling means positively connects said position adjusting means to said head supporting plate.

4,684,361

CENTRIFUGE

Louis W. Feldman, and David H. Yawn, both of Houston, Tex., assignors to Cardiovascular Systems, Inc., The Woodlands, Tex.

Filed Oct. 11, 1985, Ser. No. 786,780
Int. Cl.[4] B04B *7/08, 9/00*
U.S. Cl. 494—41 **7 Claims**



1. A centrifuge for processing liquids having a first and second assembly of components one of which is capable of rotating relative to the other in which

the first assembly of components comprises core means for receiving and expelling the liquid and for transmitting the liquid to said second assembly,

the second assembly of components comprises bowl means rotatively mounted about said core means for receiving the liquid and holding it,

the bowl means having upwardly extending neck means for receiving the core means, the neck means rotating about said core means during operation of the centrifuge,

first seal means provided between said core means and said neck means for preventing the egress of liquid from between said core means and said neck means to the exterior of the centrifuge, said first seal means comprising expansible seal means connected to said core means and expanding to sealingly contact said neck means,

channel means provided between said core means and said neck means through which a minimal portion of liquid can flow and is forced upwardly and outwardly during operation of the centrifuge, the minimal portion of the liquid flowing into a trap zone formed between said neck means and outwardly and downwardly shoulder extension means of said core means, the flow of the minimal portion of the liquid being prevented from exiting the centrifuge by the first expansible seal means connected to said shoulder extension means and contacting said neck means, said first seal means expanding to push against the neck means, and

second seal means disposed within said trap zone and contacting said shoulder extension while the centrifuge is at rest to seal off the trap zone and prevent liquid flow through the channel means, said second seal means made of deformable material which deforms in response to the forces of rotation to open the channel means and permit flow into the trap zone.

4,684,362

METHOD FOR COLLECTING NASAL SECRETIONS

James J. Holt, 4004 5th St., NW., Rochester, Minn. 55901

Filed Mar. 12, 1981, Ser. No. 242,932
Int. Cl.[4] A61M *31/00, 1/00*
U.S. Cl. 604—54 **11 Claims**

1. The method of collecting uncontaminated and undiluted nasal secretions from a nose including an inferior meatus, comprising,

providing a collection apparatus including an elongated collection arm and a suctioning arm in communication with a collection cup,

connecting said suctioning arm to a source of vacuum,

inserting one end of said collection arm into the nose,

directing the collection arm away from the inferior meatus thereby avoiding contamination by lacrimal secretions,

maintaining the nose free of contamination and dilution factors,

causing vacuum to be communicated from said suctioning arm to said collection arm,

and thereby drawing nasal secretions into said collection arm and depositing said secretions in said collection cup.

4,684,363

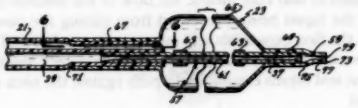
RAPIDLY INFLATABLE BALLOON CATHETER AND METHOD

Suha V. Ari, Irvine, and Glen L. Lieber, Anaheim, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Continuation of Ser. No. 666,873, Oct. 31, 1984, abandoned. This application Jun. 13, 1986, Ser. No. 874,804

Int. Cl.[4] A61M *29/00*

U.S. Cl. 604—98 16 Claims



1. A method of dilating a region of a patient's vascular system comprising:

providing a catheter having a distal end, at least first and second lumens, and a balloon adjacent the distal end with the first and second lumens extending to the interior of the balloon;

passing as purging liquid in series through the first lumen, the balloon and the second lumen to purge air from the balloon out through the second lumen;

inserting the catheter into the patient's vascular system to place the balloon in the region of the patient's vascular system which is to be dilated;

thereafter passing an inflation liquid in parallel through the first and second lumens to the balloon to inflate the balloon to dilate such region of the vascular system; and

discharging the inflation liquid from the balloon in parallel through the first and second lumens to deflate the balloon.

4,684,364

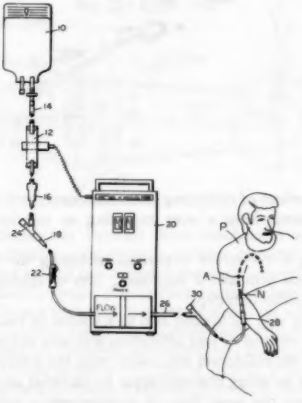
SAFETY ARRANGEMENT FOR PREVENTING AIR EMBOLISM DURING INTRAVENOUS PROCEDURES

Philip N. Sawyer, Brooklyn, and Joseph F. Fitzgerald, Queens, both of N.Y., assignors to Interface Biomedical Laboratories Corporation, Brooklyn, N.Y.

Filed Apr. 12, 1983, Ser. No. 484,205

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—123 30 Claims



1. An intravenous system comprising a source of intravenous fluid, first catheter means for insertion into the vascular system of a patient, a pump for performing a pumping operation and urging the fluid from said source to said first catheter means, second catheter means coupling said pump to said source, said pump including means to terminate said pumping operation upon an opening of said second catheter means to ambient atmosphere, and the flow control device in at least said first catheter means to prevent movement of air therethrough upon an opening of the said first catheter means to ambient atmosphere.

4,684,365

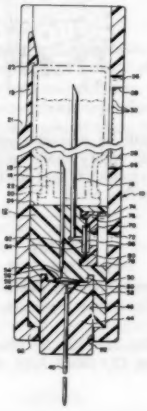
DISPOSABLE REFILL UNIT FOR IMPLANTED MEDICATION INFUSION DEVICE

Robert H. Reinicke, Mission Viejo, Calif., assignor to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 694,707, Jan. 24, 1985, abandoned. This application Oct. 10, 1985, Ser. No. 786,213

Int. Cl.[4] A61M *5/16*; A61J *1/00*

U.S. Cl. 604—126 33 Claims

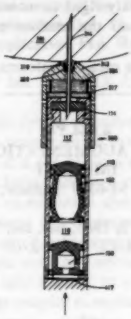


1. A medication refill arrangement for an implanted medication infusion device of the type having a medication reservoir and means for maintaining said reservoir at a pressure substantially less than the pressure of the body in which the device is implanted, comprising a hollow tubular member, a manifold member secured in one end of said tubular member carrying first and second tubes extending into the interior of said tubular member, said first and second tubes being adapted to be inserted through the closure member of a medication bottle which is placed in the other end of said tubular member and moved into engagement with said tubes with sufficient force to cause said tubes to penetrate said closure member, said first tube communicating with the medication in said bottle after penetration of said closure member, said first tube communicating with the medication in said bottle after penetration of said closure member and said second tube communicating with the ullage space within said bottle, a hollow needle positioned in said manifold member opposite said tubes and extending outwardly from said one end of said tubular member, means defining a first passageway in said manifold extending between said first tube and said hollow needle, an opening in a sidewall of said tubular member, and means defining a second passageway in said manifold extending between said second tube and said sidewall opening.

4,684,366
SYRINGE FOR THE REMOTE INJECTION OF ANIMALS AND FISH

Christopher G. Denny, and Brian J. Harvey, both of 1175B Newport Avenue, Victoria, B.C., Canada (V8S 5E6)

Filed Sep. 16, 1985, Ser. No. 776,673
Claims priority, application Canada, Mar. 15, 1985, 476641
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—130 8 Claims



1. A syringe comprising:
(a) a barrel having a closed forward end provided with a longitudinally extending channel therethrough;
(b) a hypodermic needle slidable received in said channel;
(c) a frangible septum disposed in said channel and adapted to be pierced upon inward sliding movement of said hypodermic needle; and,
(d) at least a single stopper slidably and sealingly disposed in said barrel to divide said barrel into (i) a forward, payload chamber, defined between the closed forward end of said barrel and the leading face of the stopper and (ii) a rearward propulsion chamber downstream of the trailing face of said stopper,

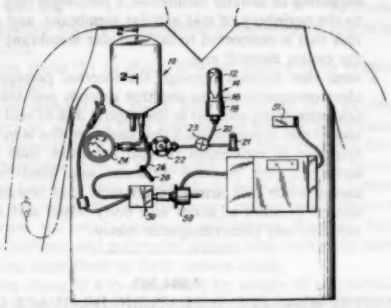
said propulsion chamber being prechargeable to a controllable, variable, predetermined gaseous pressure; and wherein said hypodermic needle is a releasing needle structure comprising: an open-ended, skirt-shaped guide having a closed end pierced by a longitudinally-extending channel; a hollow hypodermic needle temporarily secured within said guide by means of a lower fixed disc attached to said needle, said hypodermic needle being adapted to be slidable within said guide; a compressed recoil member disposed between said fixed disc and said guide; and an upper, temporary, disintegratable disc held in place by an impact frangible seal; whereby disintegration of said disc results in movement of said needle into said cylindrical guide.

4,684,367
AMBULATORY INTRAVENOUS DELIVERY SYSTEM

Irving Schaffer, Fairfield, Conn., and Claude L. Emmerich, Scarsdale, N.Y., assignors to Meditec Research Associates, Westport, Conn.

Filed Apr. 12, 1985, Ser. No. 722,934
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—140 27 Claims

1. An apparatus for intravenous delivery of substances while permitting the recipient to be ambulatory comprising:
(a) means for containing and delivering a substance to be delivered to the recipient, said containing means capable of being supported and carried by the recipient;
(b) means for providing pressure to the substance to be delivered;
(c) means to control the flow rate of the substance to the recipient;
(d) meter means positioned within the flow path of said substance to determine the flow rate of the said substance, said meter means including heating means disposed to supply heat to a portion of said substance as it flows, detecting means disposed to detect temperature changes in the substance such that a pulse of heat may be intermittently added to said substance by said heating means and

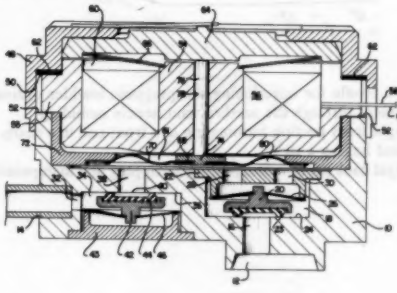


detected downstream by said detecting means to determine the flow rate of said substance; and
(e) means to adjust said flow control means in response to said signal indicating the flow rate so as to maintain a predetermined flow rate of the substance.

4,684,368
INVERTED PUMP

Richard L. Kenyon, Irvine, Calif., assignor to Parker Hannifin Corporation, Cleveland, Ohio

Continuation of Ser. No. 616,370, Jun. 1, 1984, abandoned. This application Jul. 3, 1986, Ser. No. 882,218
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—152 4 Claims



1. A pump comprising:
a body having an inlet port and an output port;
a housing secured to one end of said body;
an electromagnetic means having an internal passage, said electromagnetic means being secured between said body and said housing, said electromagnetic means cooperating with said body to define an internal cavity on one side of said electromagnetic means;
an armature that is located on one side of said electromagnetic means that is opposite from said internal cavity, said armature being movable between said body and said housing, said armature contacting the one side of said electromagnetic means in response to energization of said electromagnetic means;
a spring located between said armature and a portion of the side of said electromagnetic means that is opposite from said internal cavity and that is away from the internal

passage of said electromagnetic means, said spring loading said armature toward said housing when said electromagnetic means is de-energized;

a partition that is located in the internal cavity between said body and said electromagnetic means, and that cooperates with said body to define a pump chamber, said partition including an annular membrane, a peripheral ring attached to the periphery of said annular membrane, and a central disk that is connected to said annular membrane adjacent the center thereof; and

a stem that extends through the internal passage of said electromagnetic means and that extends past said spring, said stem being secured to the central disk of said partition and to said armature such that said partition is movable in response to movement of said armature, said partition having a first position adjacent said electromagnetic means when said armature contacts said housing and a second position adjacent said body when said armature contacts said electromagnetic means.

4,684,369

INSTRUMENT FOR SUPRAPUBIC DRAINAGE OF THE BLADDER, INSERTED THROUGH THE URETHRA

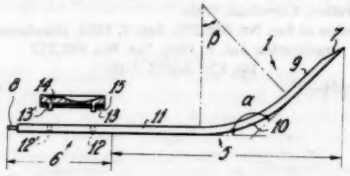
Dirk A. A. Wildemeersch, Pierslaan, 125, B-8300 Knokke-Heist, Belgium

Continuation of Ser. No. 484,564, Apr. 13, 1983, abandoned. This application Aug. 19, 1985, Ser. No. 767,238

Claims priority, application Belgium, Apr. 14, 1982, 0/207.811; Jun. 28, 1982, 0/208.473

Int. Cl.[4] A61M 5/32

U.S. Cl. 604—272 **12 Claims**



1. A needle for introducing a suprapubic bladder drainage instrument through the urethra, said needle including:

a rigid front portion terminating at a front end in a sharp tip and having a rear;

a rigid back portion constituting a gripping and manipulating element of the needle and joined to the rear of said front portion;

the rigid front portion including a curved part, the curvature being such that the tip is angled at between 115° and 145° to the rear of the front portion;

means for connecting the needle to a catheter; and

deformable guide means for introducing said needle as connected to said catheter into the urethra wherein,

the needle is sufficiently rigid to maintain said curved part during insertion into the bladder and puncture of the bladder wall, and

said deformable guide means conforms to said curved part.

4,684,370

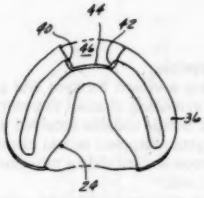
STENTS FOR BONE AUGMENTATION BY SURGICAL IMPLANT

Garret D. Barrett, Box 51-6357 Saginaw, Grand Blanc, Mich. 48439

Filed Oct. 2, 1985, Ser. No. 782,956

Int. Cl.[4] A61F 2/00

U.S. Cl. 623—66 **9 Claims**



1. A surgical stent for implant augmentation to establish a tissure morphology at a body site using a mass of implant material comprising:

a member of transparent substantially rigid material having a cavity section forming an open sided cavity configured according to a desired tissue morphology, and having adjacent flange portions shaped to fit over the adjacent tissues and locate said open sided cavity in the position of said desired tissue morphology;

said cavity section having at least one opening extending therethrough into said open sided cavity enabling access to the interior of said cavity for surgical procedures with said stent in position at said body site.

4,684,371

OXIDATION HAIR DYES COMPRISING M-PHENYLENEDIAMINE DERIVATIVES AS COUPLING COMPONENTS

Günther Konrad, Hilden; Norbert Maak, Neuss, and Edgar Lieske, Düsseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Düsseldorf-Holthausen, Fed. Rep. of Germany

Continuation of Ser. No. 578,186, Feb. 8, 1984, abandoned, which is a continuation-in-part of Ser. No. 252,596, Apr. 9, 1981, abandoned. This application Dec. 19, 1985, Ser. No. 814,062

Claims priority, application Fed. Rep. of Germany, May 2, 1980, 3016881

Int. Cl.[4] A61K *7/13*

U.S. Cl. 8—408 5 Claims

1. A method for the dyeing of human hair comprising applying to said hair, at temperatures ranging substantially from about 15° to 40° C. at a pH of from about 8 to 10 for a time sufficient to effect dyeing through oxidation, a hair dyeing effective amount of an oxidation dye composition for dyeing human hair comprising (a) a compound selected from the group consisting of 2,4-diaminophenyl-acetic acid, 2,4-diaminophenoxyacetic acid, and ammonium, alkali metal, and alkaline earth metal salts thereof, or a mixture of two or more of said compounds, as coupler component, and (b) a compound selected from the group consisting of p-phenylenediamine, p-toluylenediamine, N-methyl-p-phenylenediamine, N,N-dimethyl-p-phenylenediamine, N,N-diethyl-p-phenylenediamine, N,N-diethyl-2-methyl-p-phenylenediamine, N-ethyl-N-hydroxyethyl-p-phenylenediamine, N,N-bis-(β-hydroxyethyl)-amino-p-phenylenediamine, methoxy-p-phenylenediamine, 2-chloro-p-phenylenediamine, 2,6-dichloro-p-phenylenediamine, 2-chloro-6-bromo-p-phenylenediamine, 2-chloro-6-methyl-p-phenylenediamine, 6-methoxy-3-methyl-p-phenylenediamine, p-toluylenediammonium sulfate, N-methyl-p-phenylenediammonium sulfate, N-ethyl-N-hydroxyethyl-p-phenylene-diammonium sulfate, N-[2-[N-ethyl-N-(4-amino-3-methyl-phenyl)-amino]-ethyl]methanesulfonamide sesquisulfate (monohydrate), and N-ethyl-N-(-2-hydroxyethyl)-1,4-phenylenediamine sulfate (monohydrate), or a mixture of two or more of said compounds, as developer component, the molar ratio of component (a) to component (b) being from about 2:1 to 1:2.

4,684,372

COMBUSTION OF VISCOUS HYDROCARBONS

Michael E. Hayes, Fernandina Beach; Kevin R. Hrebenar, Jacksonville; Patricia L. Murphy, Amelia Island; Laurence E. Futch, Jr., Fernandina Beach; James F. Deal, III, Amelia Island, and Paul L. Bolden, Jr., Fernandina Beach, all of Fla., assignors to Petroleum Fermentations N.V., Curacao, Netherlands Antilles

Continuation-in-part of Ser. No. 547,892, Nov. 2, 1983, Pat. No. 4,618,348. This application Sep. 24, 1984, Ser. No. 653,808

The portion of the term of this patent subsequent to Oct. 21, 2003, has been disclaimed.

Int. Cl.[4] C16L *1/32*

U.S. Cl. 44—51 14 Claims

1. A method for utilizing viscous hydrocarbons as combustible pre-atomized fuels, comprising:

(A) forming a hydrocarbon-in-water emulsion using an effective amount of a surfactant package comprising at least one water-soluble surfactant, said hydrocarbon-in-water emulsion

(1) comprising a hydrocarbon characterized by API gravity of about 20° API or less, viscosity of about 1000 centipoise or greater at 212° F., a paraffin content of about 50% by weight or less and, an aromatic content of about 15% by weight or greater, and

(2) having a hydrocarbon:water ratio from about 60:40 to about 90:10 by volume; and

(B) burning the resultant hydrocarbon-in-water emulsion.

4,684,373

GASOLINE ADDITIVE COMPOSITION

Marcel Vataru, Los Angeles, and Thomas A. Schenach, Huntington Beach, both of Calif., assignors to Wynn Oil Company, Fullerton, Calif.

Filed Jul. 31, 1986, Ser. No. 891,126

Int. Cl.[4] C10L *1/14, 1/22, 1/18*

U.S. Cl. 44—63 14 Claims

1. A gasoline additive composition comprising the following components:

(a) from about 0.1 to about 20% by weight of an organic peroxide;

(b) from about 0.5 to about 20% by weight of a gasoline detergent selected from fatty amines and the ethoxylated and propoxylated derivatives thereof, fatty diamines, fatty imidazolines formed by reaction of a fatty acid having from ten to twenty carbon atoms with ethylene diamine and derivatives thereof, polymeric amines and derivatives thereof; and combinations of said amines, diamines, fatty imidazolines, and polymeric amines with carboxylic acids having from three to forty carbon atoms;

(c) from about 99.4 to about 60% by weight of a hydrocarbon solvent selected from unleaded gasoline and higher boiling solvents compatible with gasoline and having no adverse effect on the performance of gasoline in the engine;

said composition intended to be used in unleaded and leaded gasolines at a level of from about 0.01% to about 5%.

4,684,374

METHOD FOR THE CONTINUOUS GASIFICATION OF SOLID FUEL

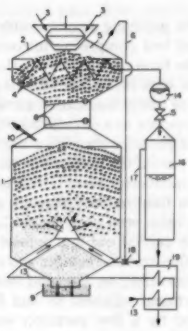
Bruno Hillinger, Hinterbrühl, and Georg Beckmann, Vienna, both of Austria, assignors to Waagner-Biro Aktiengesellschaft, Austria

Continuation of Ser. No. 681,326, Dec. 13, 1984, abandoned. This application Nov. 18, 1986, Ser. No. 931,850

Claims priority, application Austria, Dec. 20, 1983, 4448/83

Int. Cl.[4] C10J *3/16*

U.S. Cl. 48—197 R 5 Claims



1. Method for the continuous gasification of solid carbonaceous fuel having a high water content, such as biomass and brown coal, comprising the steps of

subjecting said fuel to drying in a heated drier by indirect heat exchange with condensing heating steam with attendant condensation of the heating steam into a condensate and removal of water as steam from said fuel, whereby said fuel does not contact the heating steam,

passing the thus-heated and dried fuel into a gasification chamber separated from the drier and the fuel contained in the drier to form a fuel bed in the gasification chamber,

recovering the condensate after the same has heated said fuel,

reducing the pressure of the recovered condensate to generate low-pressure steam,

mixing at least a portion of the thus-generated low-pressure steam with the steam removed from said fuel to obtain a steam mixture,

introducing the thus-obtained steam mixture and an oxygen-containing gas into said bed of heated and dried fuel in said gasification chamber, whereby hot generator gas is formed in a glowing region of said fuel bed from said heated and dried fuel, said removed steam, and said oxygen-containing gas, and

directly removing the thus-formed generator gas from said gasification chamber for consumption while still in its hot state, while bypassing said drier, whereby the generator gas is prevented from entering the drier and becoming mixed with said steam removed from said fuel.

4,684,375

METHOD FOR GASIFYING A MATERIAL USING A CIRCULATING FLUIDIZED BED

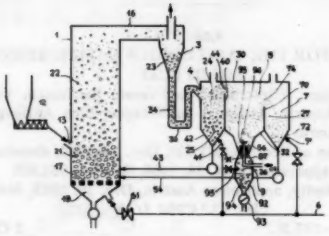
Jean-Xavier Morin, and Michel Marcellin, both of Le Creusot, France, assignors to Framatome & Cie., Courbevoie, France

Filed Apr. 19, 1985, Ser. No. 725,173

Claims priority, application France, Apr. 20, 1984, 84-06293

Int. Cl.[4] C10J *3/54*

U.S. Cl. 48—197 R **1 Claim**



1. In a method for gasifying a combustible material in a first circulating fluidized bed comprising introducing the material to be gasifying in the form of particles in a fluidization chamber provided at its base with means for effecting a fluidization by an ascending flow of a first fluidization gas at a speed which is so regulated as to operate as a circulating bed, discharging the gases and entrained particles through a discharge circuit connected to an upper part of the fluidization chamber and passing through a particle recovering means, returning the recovering particles to the first fluidized bed through a recycling circuit and subjecting the recovered particles in the return path to a processing which is carried out in a second fluidized bed in a device outside the fluidization chamber and comprising a filtration compartment traversed by a second fluidization gas and a processing compartment adjacent to said filtration compartment and separated by a first partition wall therefrom; the improvement comprising causing the second fluidization gas to traverse the filtration compartment at a speed which is so regulated as to put into suspension only fine particles having sizes smaller than a given limit, recovering the largest particles and directly recycling them in the first fluidized bed and flowing the fine particles over the first partition wall into the processing compartment and subjecting the fine particles to a processing with a comburent gas in the processing compartment so as to agglomerate ashes by formation in the processing compartment of a high temperature zone, withdrawing the agglomerated ashes at the base of the processing compartment and returning unburnt fine particles to the first fluidized bed through a second recycling circuit by flowing the unburnt fine particles over a second partition wall to an adjacent storage compartment and returning the unburnt fine particles to the first fluidized bed from the bottom of said storage compartment.

4,684,376

PROCESS FOR THE MODIFICATION OF AROMATIC POLYMERS VIA FRIEDEL-CRAFTS REACTIONS TO PRODUCE NOVEL POLYMERS AND THE USE THEREOF

Elena S. Percec, Pepper Pike, and George S. Li, Macedonia, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

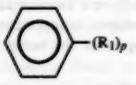
Division of Ser. No. 657,137, Oct. 3, 1984, Pat. No. 4,596,860. This application Jan. 30, 1986, Ser. No. 824,128

Int. Cl.[4] B01D *53/22*; C08L *71/04*

U.S. Cl. 55—16 **15 Claims**

1. Novel substituted polyarylene polymers as semipermeable membranes useful for the separation of gases from a mixture containing at least two fractions into enriched fractions of each having the formula

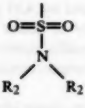
wherein each R is independently a C_1 to C_8 aliphatic or a C_5 to C_7 cycloaliphatic radical, an aryl radical having the formula



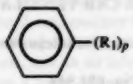
wherein each R_1 is independently a C_1 to C_8 aliphatic radical and p is an integer of 0 to 4, each radical being free of a tertiary alpha-carbon atom; A is hydrogen, halogen, an aliphatic or an aryl radical; Y is a dilvalent oxygen or sulflur atom or a carbonate group; n is an integer of from about 75 to about 10,000; and

wherein G is present in at least five percent of said polyarylene units and is selected from the group consisting of alkyl sulfonyl groups having the formula

where R_a is a C_1 to C_{20} aliphatic radical; sulfonamide groups having the formula



where R_2 and is a C_1 to C_{20} aliphatic or aryl radical of the formula



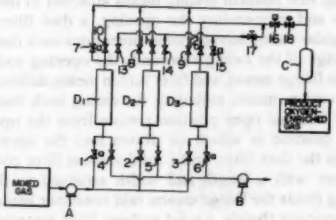
or a naphthyl radical where R_1 and p are as described above and phosphorus groups.

4,684,377

PROCESS FOR PRODUCING OXYGEN-ENRICHED GAS

Kazuo Haruna, Kakogawa; Kanji Ueda, Ashiya, and Masaru Uno, Akashi, all of Japan, assignors to Seitetsu Kagaku Co., Ltd., Hyogo, Japan

Filed Jun. 3, 1986, Ser. No. 870,052
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—26 **4 Claims**



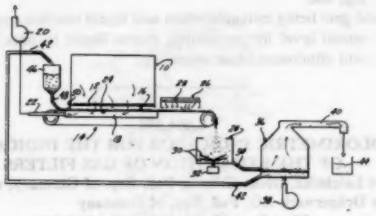
1. A process for producing an oxygen-enriched gas from a gas mixture containing oxygen and nitrogen as main gas components by pressure swing adsorption, using a set of three adsorption columns, each packed with a zeolite molecular sieve as an adsorbent through a cyclic operation of adsorption under a pressure of from atmospheric pressure to 5,000 mm H_2O and desorption under a vacuum pressure down to a final pressure of 150 mm Hg abs., which comprises passing the gas mixture through a first adsorption column, thereby conducting adsorption of substantially other gas components except the oxygen gas, while bringing a third adsorption column which has completed adsorption into a vacuum pressure through the inlet thereof, thereby conducting desorption of the adsorbed gas components in the third adsorption column and withdrawing the resulting desorbed gas components through the inlet thereof in the direction opposite to the inflow direction of the gas mixture for adsorption, while connecting the outlet of the third adsorption column to the outlet of a second adsorption column which has completed desorption at the same time as the initial stage of the desorption of the third adsorption column, thereby transferring the oxygen-enriched gas remaining in the third adsorption column therefrom to the second adsorption column, thereby recovering the remaining oxygen-enriched gas from the third adsorption column; discontinuing the remaining gas transfer before the pressure of the third adsorption column becomes equal to that of the second adsorption column, while continuing the desorption of the third adsorption column through the inlet thereof; initiating filling of a part of the product oxygen-enriched gas into the second adsorption column through the outlet thereof at the discontinuation of the remaining gas transfer, and repeating the foregoing cyclic operations one adsorption column to another successively.

4,684,378

METHOD AND APPARATUS FOR REMOVING PAINT OVERSPRAY

Jack R. Bratten, 5970 St. James Dr., West Bloomfield, Mich. 48033

Continuation of Ser. No. 597,675, Apr. 6, 1984, abandoned. This application Jul. 31, 1985, Ser. No. 761,658
Int. Cl.[4] B01D *46/04*
U.S. Cl. 55—96 **16 Claims**



1. A process for removing paint overspray suspended in air comprising the steps of:

forming a bed of beads of material to which said paint will be adherent thereto when dried but readily allow substantially complete dislodging soley by mechanical agitation of the beads;

circulating said paint carrying air through said bed of beads to cause deposition of said paint on the surfaces of said beads in said bed;

drying the paint deposited on the beads to form a solid deposit of dried paint on the surface of said beads;

subsequently mechanically agitating said beads after completion of said drying step said step of mechanically agitating said beads carried out in the absence of any substantial heating of said dried paint carrying beads to substantially completely loosen and dislodge said dried paint from said bead surfaces solely by said mechanically agitating said beads; and

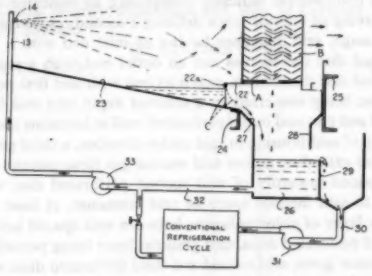
separating said dislodged paint from said beads.

4,684,379

AIR CLEANER ASSEMBLY

David E. Gambrell, Piedmont, S.C., assignor to Thermo Kinetics Industries, Inc., Greenville, S.C.

Filed Nov. 7, 1985, Ser. No. 795,865
Int. Cl.[4] B01D *47/02*
U.S. Cl. 55—227 **3 Claims**



1. An air cleaner having an elongated housing including an air inlet and an air outlet, a bottom for retaining liquid, a liquid spray section in said housing, an eliminator blade assembly and means moving air longitudinally through said spray section for washing and said eliminator blade assembly for removing liquid comprising:

a transverse support for positioning said eliminator blade assembly in raised position above said bottom creating a space beneath said eliminator blade assembly;

means establishing a liquid level in said housing for creating a seal preventing the passage of air through said space beneath said eliminator blade assembly;

said means establishing a liquid level including a gate connected adjacent said support and extending between said support and said bottom retaining said liquid in said housing, and

said gate being movable when said liquid reaches a predetermined level for permitting excess liquid to pass beneath said eliminator blade assembly.

4,684,380

COLORIMETRIC INDICATOR FOR THE INDICATION OF THE EXHAUSTION OF GAS FILTERS

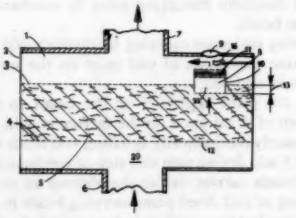
Kurt Leichnitz, Gross Grönau, Fed. Rep. of Germany, assignor to Drägerwerk AG, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 809,011

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1984, 3445639

Int. Cl.[4] B01D *53/04*

U.S. Cl. 55—274 **5 Claims**



1. A respirator filter construction, comprising a filter housing having a respirator gas inlet and a respirator gas outlet at respective ends, said housing defining a first respirator gas flow passage between said inlet and said outlet, an outlet perforated wall extending across said first gas flow passage and defining an outlet chamber with said housing which communicates with said outlet, an inlet perforated wall extending across said first gas flow passage and defining an inlet chamber with said housing which communicates with said inlet, a filter material in said first gas flow passage between said inlet and outlet perforated walls, a colorimetric indicator comprising an indicator container having an interior space defining a second respirator gas flow passage, said container having an inlet end with a first perforated disc thereacross and an outlet end with a second perforated disc thereacross, said inlet end with said first perforated disc being immersed by a selected depth into said filter material and into said outlet perforated wall at locations spaced inwardly of said housing in said outlet chamber, a third perforated disc extending across said second gas flow passage and being spaced inwardly of said second perforated disc with respect to said interior space of said container, at least one granular layer of color indicator between said spaced second and third perforated discs, said granular layer being permeable to respirator gases, said second and third perforated discs with said granular layer therebetween being spaced away from said filter material to leave a portion of said interior space free between said first perforated disc and said second perforated disc whereby respirator gases passing through said first perforated disc pass into said second gas flow passage for exposure to said granular layer before respirator gases pass through said outlet perforated wall, and a window in said housing aligned with said container for viewing said container.

4,684,381

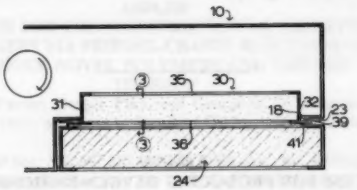
CHEMICAL FILTER FOR USE IN A CAB VENTILATION SYSTEM

Ralph E. Wasylyniuk, Box 337, Raymore, Saskatchewan, Canada (S0A 3J0)

Filed Apr. 14, 1986, Ser. No. 851,944

Int. Cl.[4] B01D *50/00*

U.S. Cl. 55—316 **9 Claims**



1. A cab ventilation system comprising a plurality of walls defining an air inlet chamber having a rectangular inlet opening in one of said walls, said one of said walls defining flange means surrounding the opening and defining an abutment surface facing outwardly of the opening and surrounding the opening, first resilient sealing means attached to the abutment surface and surrounding the opening, a dust filter having a rectangular casing having outer dimensions such that an outermost edge of the casing surrounds the opening and lies adjacent the flange means, and filter screen means defined inwardly of the casing, means mounting the casing such that it can be moved from an open position remote from the opening to a closed position in which air drawn into the opening passes through the dust filter, and a solid sorbent filter comprising a container with a length and width arranged to fit into the opening inside the flange means, said container having a thickness receiving therein a solid sorbent filter material, a flange surrounding the container at one face of the container such that the thickness of the container projects into the opening with the flange adjacent said abutment surface and in contact with said first resilient sealing means and second resilient sealing means attached to a surface of said flange remote from said first resilient sealing means and surrounding the container whereby the flange can be inserted between the dust filter and said abutment surface with said first resilient sealing means between said abutment surface and said flange and said second resilient sealing means between the flange and said casing.

4,684,382

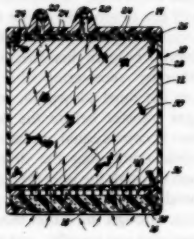
EVAPORATIVE FUEL CONTROL CANISTER CONTAINING EPDM FOAM FILTER

Ismat A. Abu-Isa, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 28, 1986, Ser. No. 834,536

Int. Cl.[4] B01D *50/00*

U.S. Cl. 55—316 **3 Claims**



1. In a carbon canister of the type used in a vehicle equipped

with a fuel reservoir and an internal combustion engine with an induction passage for the purpose of evaporative fuel vapor control, said canister having a housing, a quantity of fuel vapor adsorbing material in said housing, a fuel vapor inlet and outlet means, and an air inlet means, wherein the improvement comprises a filter means of EPDM elastomeric foam positioned in said housing for the adsorption of fuel vapor and condensed liquid fuel from said fuel reservoir and the desorption of the same when fresh atmospheric air is purged through said filter means into the induction passage of said internal combustion engine.

4,684,383

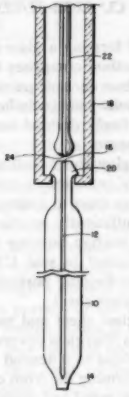
METHODS FOR REDUCING THE WATER CONTENT OF OPTICAL WAVEGUIDE FIBERS

Ralston R. Cavender, Jr.; Elizabeth S. Connolly, both of Wilmington, N.C.; Dale R. Powers, Painted Post, N.Y., and John E. Ritter, Wilmington, N.C., assignors to Corning Glass Works, Corning, N.Y.

Filed Jan. 30, 1986, Ser. No. 824,137

Int. Cl.⁴ C03B *37/018*

U.S. Cl. 65—3.12 **2 Claims**



1. A method for reducing the water content of an optical waveguide fiber formed by drawing a glass blank, said glass blank having (1) an aperture therethrough, (2) being formed at an elevated temperature, and (3) including regions whose thermal coefficients of expansion differ by at least about 7×10^{-7} cm/cm°C. such that the blank's probability of fracture if cooled to room temperature is at least about 75 percent, the method comprising the steps of:

(a) cooling the blank from the elevated temperature to a temperature within a preselected temperature range, the blank's probability of fracture within said range being below about 50 percent, the low end of said range being above room temperature and the high end of said range being below about 550° C., said range being selected to minimize the diffusion of water from the surface of the aperture into the body of the blank;

(b) maintaining the temperature of the blank within the preselected temperature range for a period of time of up to about 48 hours until drawing is to be performed; and

(c) drawing the blank at an elevated temperature while applying a vacuum to the aperture, the elevated temperature and the vacuum removing sufficient water from the blank prior to aperture closure so as to produce a finished fiber having a water level of less than 100 parts per billion.

4,684,384

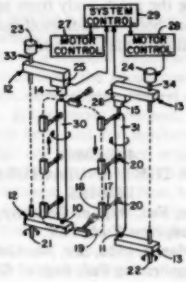
CONVEYOR DEPOSITION METHOD AND APPARATUS FOR MAKING OPTICAL FIBER PREFORMS

George E. Berkey, Pine City, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Continuation of Ser. No. 833,552, Feb. 27, 1986, abandoned. This application Sep. 29, 1986, Ser. No. 913,134

Int. Cl.⁴ C03B *37/027*

U.S. Cl. 65—3.12 **29 Claims**



1. A method of forming at least one preform comprising

providing at least one elongated cylindrical starting member,

rotating said at least one starting member about the axis thereof, and

depositing a plurality of layers of glass soot on said starting member to build up a coating thereon, said coating having first and second ends,

the improvement comprising depositing said layers by providing a plurality of soot generating means, said soot generating means being arranged in a series the length of which is greater than the length of said coating, a portion of said series of generating means extending adjacent said starting member such that soot therefrom is directed toward that portion of the length of said starting member on which said coating is located, and traversing said series of generating means along said starting member.

4,684,385

METHOD FOR THE MANUFACTURE OF GLASS BODIES

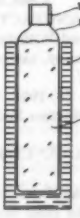
Rolf Clasen, Aachen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1986, Ser. No. 835,589

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511453

Int. Cl.⁴ C03B *37/023*

U.S. Cl. 65—17 **15 Claims**



1. A method for the manufacture of a glass body, said method comprising:

(a) forming a starting thixotropic suspension of silicon dioxide in a dispersing liquid;

(b) applying a mechanical force in sufficient degree to said suspension to homogenize said suspension and reduce its viscosity to the minimum;

(c) pouring the resultant low-viscosity suspension into a mold made of a hydrophobic material and having a shape corresponding to the shape of the glass body to be produced and allowing said suspension to thixotropically solidify in said mold to form a green body;

(d) drying the green body while in said mold until a shrinkage of about 10% of the green body is achieved;

(e) then removing the green body from said mold and subjecting the green body to additional manufacturing steps for the production of the glass body.

4,684,386

METHOD FOR THE MANUFACTURE OF GLASS BODIES

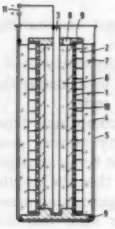
Rolf Clasen, Aachen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 6, 1986, Ser. No. 836,919

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511451

Int. Cl.[4] C03B *37/016*

U.S. Cl. 65—18.1 **23 Claims**



1. A method for the manufacture of a porous green body, adapted upon purification and sinterification of being formed into a glass body, said method comprising, introducing into an electrophoretic cell provided with an anode, a cathode and a porous membrane separating, said anode and cathode, an aqueous suspension having a highly dispensed content of silicon dioxide particles and applying a voltage between said cathode and anode to thereby cause said silicon dioxide particles to separate from said suspension and deposit on said membrane.

4,684,387

METHOD FOR MANUFACTURING GLASS BODIES

Rolf Clasen, Aachen, and Wilhelm G. Hermann, Roetgen, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

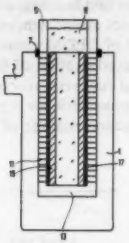
Filed Feb. 24, 1986, Ser. No. 832,209

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511457

Int. Cl.[4] C03B *37/016*

U.S. Cl. 65—18.4 **15 Claims**

1. In a method of manufacturing glass bodies, in which the starting material for the glass body, is a suspension having a microdispersed solids content which is used to form a porous green body which is subsequently purified and sintered, the improvement wherein the phases of the suspension are separated in an arrangement in which a pressure difference is built up, in said arrangement the green body being deposited on a porous membrane whose shape corresponds to that of the glass body to be produced, the pores of the membrane having a



diameter in the range from 1 to 500 times the average particle diameter of the solids content of the suspension.

4,684,388

METHOD OF FORMING A GLASS SHEET WITH A UV-BASE CERAMIC PAINT THEREON

Premakaran T. Boaz, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 1, 1986, Ser. No. 936,575

Int. Cl.[4] C03B *23/023*; C03C *8/04*

U.S. Cl. 65—24 **2 Claims**

1. A method of forming a glass sheet with a ceramic paint thereon, which method comprises the steps of:

applying a UV-base ceramic paint to the said glass sheet, said UV-base ceramic paint including finely divided zinc metal powder and finely divided stannous oxide powder as a constituent thereof;

subjecting said glass sheet with said UV-base ceramic paint thereon to UV radiation to cure said paint;

heating said glass sheet to a temperature which softens said glass sheet sufficiently so that said glass sheet can be formed, said heating burning off any remaining organic material contained in said UV-base ceramic paint and binding said remaining portion of said UV-base ceramic paint to said glass sheet;

engaging said glass sheet and said UV-base ceramic paint thereon with a fiberglass covered forming die to form said heated glass sheet to a desired shape;

removing said forming die from engagement with said glass sheet, said zinc metal and stannous oxide additions to said UV-base ceramic paint being effective to prevent sticking of any of said UV-base ceramic paint to said forming die; and

cooling said glass sheet to obtain a formed glass sheet with a ceramic paint thereon.

4,684,389

METHOD OF FORMING A GLASS SHEET WITH AN OIL-BASE CERAMIC PAINT THEREON

Premakaran T. Boaz, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 1, 1986, Ser. No. 936,576

Int. Cl.[4] C03B *23/023*; C03C *8/04*

U.S. Cl. 65—24 **2 Claims**

1. A method of forming a glass sheet with a ceramic paint thereon, which method comprises the steps of:

applying an oil-base ceramic paint to the said glass sheet, said oil-base ceramic paint including finely divided zinc metal powder as a constituent thereof, said oil-base ceramic paint containing no stannous oxide;

heating said glass sheet to a temperature which softens said glass sheet sufficiently so that said glass sheet can be formed, said heating driving off the volatiles contains in said oil-base ceramic paint and bonding said remaining portion of said oil-base ceramic paint to said glass sheet;

engaging said glass sheet and said oil-base ceramic paint thereon with a fiberglass covered forming die to form said heated glass sheet to a desired shape;

removing said forming die from engagement with said glass sheet, said zinc metal addition to said oil-base ceramic paint being effective to prevent sticking of any of said oil-base ceramic paint to said forming die; and

cooling said glass sheet to obtain a formed glass sheet with a ceramic paint thereon.

4,684,390

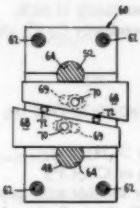
RACK ALIGNING FIXTURE AND METHOD OF ITS USE

Frederick W. Winzer, East Granby, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.

Filed May 7, 1985, Ser. No. 731,301

Int. Cl.⁴ C03B 7/10

U.S. Cl. 65—133 **8 Claims**



1. An aligning fixture for aligning the rack teeth of two racks of a rack and pinion mechanism in parallel relation with each other to obtain proper mating of the rack teeth with the pinion gear teeth, said rack and pinion mechanism being used to drive straight line shears for cutting glass runners into individual gobs, said fixture comprising a base plate having two spaced-apart machined holes for receiving the racks of a rack and pinion mechanism, a recess means defined across the back of said base plate for receiving two opposing wedge means, said recess means extending through a portion of one of said machined holes and through a portion of the other of said machined holes, two opposed wedge means in said recess means for angularly orienting the rack teeth of each of the racks to face and be parallel to the rack teeth of the other rack, said wedge means movable relative to each other in said recess means and each of said wedge means having a straight edge, said straight edges being parallel to each other and extending into said two spaced-apart holes when said wedge means are in a mating position in said recess means, pins spaced-apart at an angle between said wedge means when said wedge means are positioned in said recess means so that said wedge means will ride on said pins, and means on said base plate for the attaching of said base plate to the housing of a rack and pinion mechanism for receiving the racks of said mechanism.

5. The method of aligning the rack teeth of the racks of a rack and pinion mechanism in parallel relation with each other to obtain proper mating of the rack teeth with the pinion gear teeth, said rack and pinion mechanism being used to drive straight line shears for cutting glass runners into individual gobs, said method comprising the steps of: exposing the racks of said rack and pinion mechanism so as to extend from a housing of the rack and pinion mechanism; positioning a rack aligning fixture on said housing in order that said racks extend into an opening in said fixture; driving opposed wedges relative to each other, each of said wedges having one straight edge in opposed relation to the straight edge of the other in order that said wedges contact said racks and move said racks in relation to said wedges to obtain the straight edges of said wedges and the teeth of said racks in parallel relation.

4,684,391

ORGANIC AMELIORATORS PROTECTED BY A HYDROCARBON STRUCTURE ALLOWING THE IMPROVEMENTS OF SOIL PROPERTIES

Bernard Bossand, Communay; Jacques Eppe, Ajaccio; Alain Faure, St. Chamond, and Gilles Leygue, Vernaison, all of France, assignors to ELF France, Paris, France

Continuation of Ser. No. 331,687, Dec. 17, 1981, abandoned. This application Nov. 21, 1985, Ser. No. 800,353

Claims priority, application France, Dec. 17, 1980, 80 26766

Int. Cl.⁴ C05F 11/02

U.S. Cl. 71—24 **12 Claims**

1. A process of making a soil ameliorator comprising a substance rich in fermentable organic matter in divided form coated with a film of a residual hydrocarbon base, said substance being selected from the group consisting of peat, leaf mould, river sludge, marsh sludge, natural dehydrated manure, artificial manure, grape marc, compost, tree bark, vegetal residue, leaf-mould bed used for mushroom cultivation, digested urban sludge and non-digested urban sludges, and said hydrocarbon base being selected from the group consisting of direct distillation bitumen, a residue from hydrocarbon distillation at atmospheric pressure, a residue from vacuum distillation of hydrocarbon visoreduction residue, asphalts, asphaltenes and road bitumens, which process comprises:

(a) incorporating, under stirring

(1) an aqueous suspension of said substance, having 50%-100% by weight of water and

(2) an amount of an aqueous emulsion of said residual hydrocarbon base containing 7%-20% by weight of water sufficient to provide from 0.25% to 25% by weight of said hydrocarbon base based on the total solids;

(b) stirring for 15 minutes to 2 hours;

(c) at a temperature of from 20° to 70° C.

4,684,392

BETA-TRIAZOLYL OXIMES AGENTS CONTAINING THEM FOR INFLUENCING THE GROWTH OF PLANTS AND THEIR USE

Costin Rentzea, Heidelberg; Hubert Sauter; Bernd Zech, both of Ludwigshafen; Gerd Heilen, Speyer, and Johann Jung, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

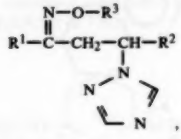
Continuation of Ser. No. 414,171, Sep. 2, 1982, abandoned, which is a continuation of Ser. No. 76,781, Sep. 18, 1979, abandoned. This application Jan. 9, 1985, Ser. No. 690,367

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1978, 2842801

Int. Cl.⁴ A01N 43/653; C07D 249/08

U.S. Cl. 71—76 **2 Claims**

2. A process for influencing plant growth, wherein crop plants or the soil in which the crop plants are grown are treated with a β-triazolyl oxime of the formula



I

wherein R^1 and R^2 are identical or different and each denotes alkyl of 1 to 6 carbon atoms, furanyl, thiophenyl, naphthyl, biphenyl or phenyl, phenyl being unsubstituted or substituted by fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, or by alkoxy of 1 to 4 carbon atoms, and R^3 denotes alkyl of 1 to 4 carbon atoms, alkenyl of 1 to 4 carbon atoms, benzyl, —CO—R^4, R^4 denoting alkyl of 1 to 4 carbon atoms which is unsubstituted or halogen- or alkoxy-substituted, or R^3 denotes —CO—NH—R^5, R^5 denoting alkyl of 1 to 4 carbon atoms or phenyl which is substituted by chlorine.

4,684,393

HERBICIDAL THIOPHENESULFONAMIDES

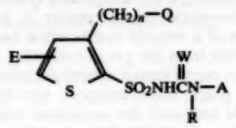
Rafael Shapiro, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 686,834, Dec. 27, 1984, abandoned, which is a continuation-in-part of Ser. No. 619,277, Jun. 11, 1984, abandoned. This application Apr. 23, 1985, Ser. No. 724,835

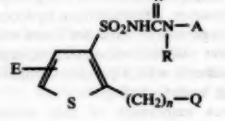
Int. Cl.[4] C07D *409/14, 411/14, 417/14;* **A01N** *47/3*

U.S. Cl. 71—90 **30 Claims**

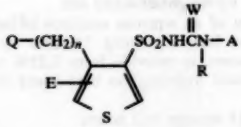
1. A compound of Formula Ia, Ib, or Ic



Ia



Ib



Ic

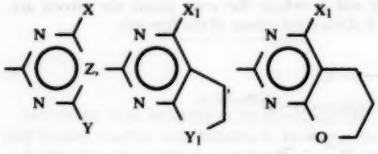
wherein

R is H or CH_3;

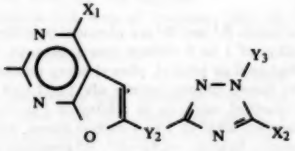
n is 0, 1 or 2;

Q is a saturated 5- or 6-membered ring containing 1 heteroatom selected from sulfur, nitrogen or oxygen or an unsaturated 5- or 6-membered ring containing 1–3 heteroatoms selected from 0–1 sulfur, 0–1 oxygen or 0–3 nitrogen and Q may optionally be substituted by one or more groups selected from SH, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_1–C_3 haloalkyl, halogen, C_1–C_3 alkoxy, C_1–C_4 alkylthio, C_3–C_4 alkenylthio, C_3–C_4 alkenyloxy, C_1–C_2 haloalkoxy, C_1–C_2 haloalkylthio, C_3–C_4 alkynylthio, C_1–C_4 cyanoalkylthio, C_1–C_2 alkylcarbonylmethylthio or C_1–C_2 alkoxycarbonylmethylthio;

E is H, C_1–C_2 alkyl, C_1–C_2 alkoxy, halogen, NO_2, C_1–C_2 haloalkyl, C_1–C_2 alkylthio, C_1–C_2 alkylsulfonyl, C_1–C_2 alkoxycarbonyl, C_1–C_2 dialkylaminosulfamoyl;



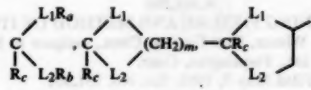
A-1 A-2 A-3



A-4 A-5

X is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, halogen, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino or di(C_1–C_3 alkyl)amino;

Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, halogen, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3 alkyl)amino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylthioalkyl, C_2–C_5 alkylsulfinylalkyl, C_2–C_5 alkylsulfonylalkyl, C_1–C_4 haloalkyl, C_3–C_5 cycloalkyl, C_2–C_4 alkynyl, $C(O)R_c$,



or $N(OCH_3)CH_3$;

m is 2 or 3;

L_1 and L_2 are independently O or S;

R_a and R_b are independently C_1–C_2 alkyl;

R_c is H or CH_3;

Z is CH;

Y_1 is O or CH_2;

X_1 is CH_3, OCH_3, OC_2H_5 or OCF_2H;

Y_2 is H or CH_3;

X_2 is CH_3, OCH_3 or SCH_3; and

Y_3 is CH_3, CH_2CH_3 or CH_2CF_3;

and their agriculturally suitable salts; provided that

(1) when X is F, Cl, Br or I, then Y is OCF_2H, OCH_3, OC_2H_5, NH_2, $N(OCH_3)CH_3$, $NHCH_3$, $N(CH_3)_2$;

(2) the total number of carbon atoms of Q must be less than or equal to 8;

(3) when Q is a saturated 5- or 6-membered ring containing one nitrogen atom, it is bonded to the thiophene ring through carbon; and

when W is S, then R is H, A is A-1 and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or

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4,684,394

HERBICIDAL ARYLOXYPHENOXYALKANOATE AND ALKENOATE DERIVATIVES, COMPOSITIONS, AND METHOD OF USE THEREFOR

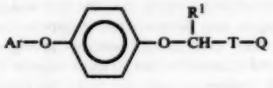
Richard B. Rogers, and Cleve A. I. Goring, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 29, 1985, Ser. No. 792,360

Int. Cl.[4] A01N *43/40;* **C07D** *213/64, 263/56, 277/62*

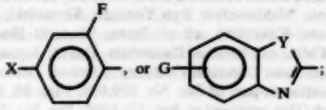
U.S. Cl. 71—90 **57 Claims**

1. A compound of the formula

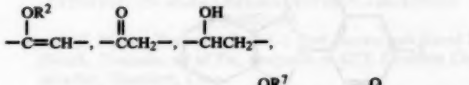


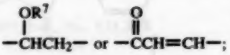
wherein

Ar represents

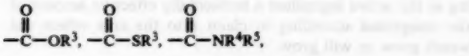


X represents —Cl, —CF_3 or —I;
G represents at the 5 or 6-ring position, —CH_3, —Br, —Cl, —F or —CF_3;
Y represents oxygen or sulfur;
T represents

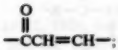




R^1 is hydrogen or loweralkyl;
R^2 is loweralkyl;
R^7 is loweralkyl, acyl or sulfonyl;
Q is



in which
R^3 is hydrogen, loweralkyl, lowerhaloalkyl, lowercyanoalkyl, loweralkenyl, lowerhaloalkenyl, loweralkynyl, loweralkoxyalkyl, lowerdialkylaminoalkyl, loweralkylthioalkyl, loweralkylsulfinylalkyl, loweralkylsulfonylalkyl, tetradrofuranylmethyl, tetrahydropyranylmethyl, benzyl, halobenzyl, loweralkylbenzyl, loweralkoxybenzyl, phenyl, halophenyl, loweralkoxyphenyl, loweralkylphenyl, cycloalkyl, cycloalkalkyl, N-alkylideneamino, sodium, potassium, magnesium or calcium; and Q is H when T is



each of R^4 and R^5 independently selected from hydrogen, loweralkyl, lowerhydroxyalkyl, lower alkoxyalkyl, loweralkylsulfonyl, loweralkenyl, loweralkynyl, lowerhaloalkenyl, cycloalkyl, phenyl, halophenyl, loweralkoxyphenyl, loweralkylphenyl, cyano, lower dialkylamino, lower monoalkylamino or loweralkoxy;
X^3 is bromo, chloro, fluoro or iodo; and
R^6 is hydrogen or acyl.

20. A herbicidal composition which comprises a herbicidally effective amount of a compound of claim **1** in admixture with a suitable carrier material.

39. A method for the control of weeds comprising an application of a herbicidally effective amount of a compound of claim **1** to the locus of said weeds.

4,684,395

AGRICULTURE SULFONAMIDES

George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

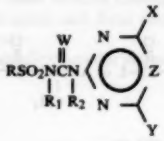
Division of Ser. No. 116,920, Jan. 30, 1980, Pat. No. 4,501,607, which is a continuation-in-part of Ser. No. 63,208, Aug. 7, 1979, abandoned, which is a continuation-in-part of Ser. No. 946,176, Sep. 27, 1978, Pat. No. 4,214,890. This application Nov. 21, 1984, Ser. No. 673,807

The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.

Int. Cl.[4] C07D *409/12, 239/47;* A01N *47/36*

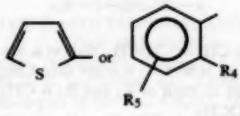
U.S. Cl. 71—92 **27 Claims**

1. A compound selected from

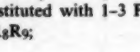


I

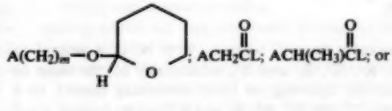
wherein
R is



R_1 and R_2 are independently H or CH_3;
R_4 is Cl, Br, F, NO_2, CH_3, OCH_3, CF_3 or $R_3S(O)_n$, where R_3 is C_1–C_6 alkyl or C_3–C_4 alkenyl;
R_5 is H, Cl, Br, F, CH_3 or —OCH_3;
n is 0, 1 or 2;
W is O or S;
X is CH_3 or —OCH_3;
Y is C_3–C_4 alkyl; C_2–C_4 alkyl substituted with CH_3O; C_2–C_4 alkyl substituted with 1–3 atoms of Cl, Br or F; C_1–C_4 alkyl substituted with C_2H_5O, CN, CO_2H, CO_2CH_3 or $CO_2C_2H_5$; CH_2F; CH_2Cl; CH_2Br; C_2–C_4 alkenyl; C_2–C_4 alkynyl; SCN: N_3; $A(CH_2)_mA_1R_7$; where m is 2 or 3;
R_7 is C_1–C_3 alkyl; A is O or S; and A_1 is O or $S(O)_n$;



where A_2 and W_1 are independently O or S, and R_{15} is C_1–C_3 alkyl, optionally substituted with 1–3 F, Cl or Br, or R_{15} is $N(CH_3)OCH_3$ or NR_8R_9;



where L is $N(CH_3)OCH_3$ or NR_8R_9, where R_8 and R_9 are independently H, CH_3 or C_2H_5, or L is OR_{10} where R_{10} is H or C_1–C_4 alkyl; $NR_{11}R_{12}$ where R_{11} is H or CH_3 and R_{12} is C_3–CH_4 alkenyl, C_2–C_3 alkyl substituted with OCH_3 or OC_2H_5, cyclopropyl or C_1–C_2 alkyl substituted with CN,

CO_2CH_3 or $CO_2C_2H_5$; OR_{13} where R_{13} is C_4–C_6 alkyl, C_1–C_4 cyanoalkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl,

or C_2–C_4 alkyl substituted with 1-3 atoms of F, Cl or Br; SR_{14} where R_{14} is C_1–C_2 cyanoalkyl, allyl or propargyl; and

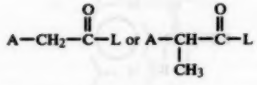
Z is CH and its agriculturally suitable salts;

with the proviso that:

(1) (a) when Y is OCH_2CF_3;

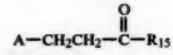
(b) when Y is $A—(CH_2)_mOR_7$ and R_7 is CH_3 or CH_3CH_2;

(c) when Y is



and L is CH_3O or CH_3CH_2O; or

(d) when Y is



and R_{15} is CH_3 or CH_3CH_2, then in a, b, c or d, R_4 must be $R_3S(O)_m$, where R_3 is other than CH_3; and

(2) when either or both of R_1 and R_2 is CH_3, Y cannot be $OCH_2CH_2OCH_3$.

4,684,396

TRIAZOLE AND IMIDAZOLE COMPOUNDS USEFUL AS PLANT GROWTH REGULATORS AND FUNGICIDES

John M. Clough, High Wycombe, and David A. Griffin, Berkshire, both of England, assignors to Imperial Chemical Industries Plc, London, England

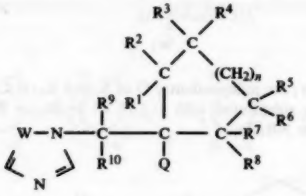
Filed Jan. 29, 1985, Ser. No. 696,169

Claims priority, application United Kingdom, Mar. 1, 1984, 8405368

Int. Cl.⁴ A01N *43/653;* **C07D** *249/08*

U.S. Cl. 07—92 **12 Claims**

1. A compound having the general formula (I):



(I)

and stereoisomers thereof, wherein W is N; Q is phenyl or halophenyl; R^1, R^2, R^3 and R^4, which may be the same or different, are H, hydroxy, or alkyl containing from 1 to 6 carbon atoms; R^5, R^6, R^7, R^8, R^9 and R^{10} are hydrogen; n is 0 or 1; and acid salts and metal complexes thereof.

11. A method of combatting fungi, which comprises applying to a plant, to seed of a plant, or to the locus of the plant or seed, an effective amount of a compound as defined in claim **1**.

12. A method of regulating plant growth, which comprises applying to the plant, to seed of a plant or to the locus of a plant or seed, an effective amount of a compound as defined in claim **1**.

4,684,397

2-SUBSTITUTED PHENYL-4,5,6,7-TETRAHYDRO-2H-ISO-INDOLE-1,3-DIONES, AND THEIR PRODUCTION AND USE

Eiki Nagano, Nishinomiya; Ryo Yoshida, Kawanishi; Hiroshi Matsumoto, Kakogawa, all of Japan; Shunichi Hashimoto, Fresno, Calif., and Katsuzo Kamoshita, Osaka, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 609,019, May 10, 1984, abandoned. This application Jun. 17, 1985, Ser. No. 744,942

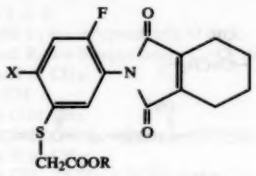
Claims priority, application Japan, May 16, 1983, 58-86213

The portion of the term of this patent subsequent to Jun. 17, 2003, has been disclaimed.

Int. Cl.⁴ A01N *43/38;* **C07D** *209/48*

U.S. Cl. 71—96 **24 Claims**

1. A 2-substituted phenyl-4,5,6,7-tetrahydro-2H-isoindole-1,3-dione of the formula:



wherein X is a chlorine atom or a bromine atom and R is a C_1–C_6 alkyl group, a C_3–C_7 cycloalkyl group, a C_3–C_6 alkenyl group, a C_3–C_6 alkynyl group, a C_2–C_6 haloalkyl group, a C_1–C_4 alkoxy (C_1–C_4)alkyl group, a C_1–C_6 alkoxycarbonyl(C_1–C_3)alkyl group or a phenyl group.

10. A method for controlling weeds which comprises applying as the active ingredient a herbicidally effective amount of the compound according to claim **1** to the area where the weeds grow or will grow.

4,684,398

HERBICIDAL CYANOGUANIDINES AND CYANOISOTHIOUREAS

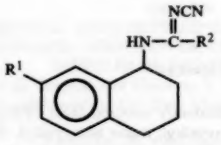
Joseph E. Dunbar, and David M. Hedstrand, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 641,810, Aug. 17, 1984. This application Mar. 17, 1986, Ser. No. 840,357

Int. Cl.⁴ A01N *31/06, 33/04;* **C07C** *125/08*

U.S. Cl. 71—98 **26 Claims**

1. A method for controlling the growth of plants comprising applying to said plants or plant loci a herbicidally effective amount of a compound of the formula:



wherein R^1 is hydrogen or methoxy; and R^2 is methylthio; alkylamino of the formula:

$$—NH—R^3$$

wherein R^3 is a straight chain, branched, or cyclic alkyl moiety of 1 to 12 carbon atoms; or alkenylamino of the formula

$$—NH—R^4$$

wherein R^4 is a straight chain or branched alkenyl moiety of 3 to 12 carbon atoms.

4,684,399
TANTALUM POWDER PROCESS

Roger M. Bergman, Sanatoga, and Charles E. Mosheim, Hereford Township, Berks County, both of Pa., assignors to Cabot Corporation, Waltham, Mass.

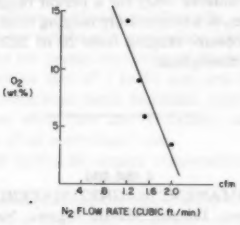
Continuation-in-part of Ser. No. 835,915, Mar. 4, 1986, abandoned. This application Sep. 29, 1986, Ser. No. 913,159
Int. Cl.[4] C22B *34/20*
U.S. Cl. 75—0.5 BB 10 Claims

1. In a process for producing capacitor grade tantalum powder wherein a tantalum compound is reduced to tantalum metal by reaction with a reducing metal, the improvement characterized by introducing the tantalum compound and the reducing metal in a continuous or incremental manner to the reactor during the course of the reduction reaction.

4,684,400
METHOD FOR CONTROLLING THE OXYGEN CONTENT IN AGGLOMERATED MOLYBDENUM POWDERS

Joseph E. Ritsko, Towanda; David J. Port, Sayre, and David L. Houck, Towanda, all of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Feb. 20, 1986, Ser. No. 831,200
Int. Cl.[4] C22C *1/04*
U.S. Cl. 75—0.5 AB 3 Claims



1. A method for introducing a controlled level of oxygen into agglomerated molybdenum metal powder, said method comprising heating said molybdenum powder at temperature of from about 700° C. to about 900° C. for a sufficient time in the presence of water vapor and a non-oxidizing atmosphere, with the amount of said non-oxidizing atmosphere being controlled to produce a partially oxidized molybdenum powder.

4,684,401
CHROMIUM-COBALT FINE ALLOY POWDER AND PROCESS FOR PRODUCING SAME

Judith A. Ladd, Sayre, and Clarence D. Vanderpool, Towanda, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed May 12, 1986, Ser. No. 861,884
Int. Cl.[4] B22F *1/00*
U.S. Cl. 75—0.5 BA 4 Claims

1. A process for producing a chromium-cobalt alloy fine powder, said powder being essentially spheres with said chromium and said cobalt being relatively uniformly distributed throughout the particles of said powder, said process comprising:

(a) firing a relatively uniform admixture consisting essentially of cobalt (II) chloride and chromium (III) chloride, with said cobalt (II) chloride and said chromium (III) chloride being in their respective anhydrous forms, in a furnace in a hydrogen atmosphere at a first temperature of at least about 400° C. and below the sublimation temperatures of chromium (III) chloride for a time sufficient to reduce essentially all of said cobalt (II) chloride to cobalt metal and to reduce essentially all of said chromium (III) chloride to chromium (II) chloride and form a first reduced mixture;

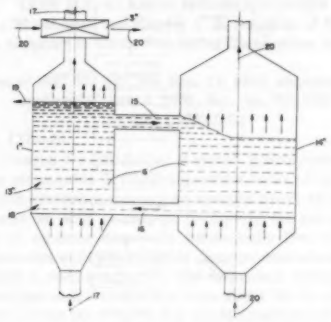
(b) elevating the temperature of said furnace to a second temperature of at least about 750° C. and below the sublimation temperature of chromium (II) chloride, the temperature elevation step being carried out by alternately raising the temperature of said furnace in increments of about 100° C. and holding the temperature of said furnace at the resulting elevated temperature for a period of time until the evolution of hydrogen chloride gas ceases, until said second temperature is reached, and firing said first reduced mixture in said furnace at said second temperature in a hydrogen atmosphere for a time sufficient to reduce essentially all of said chromium (II) chloride to chromium metal without causing appreciable melting of said cobalt metal, and form said chromium-cobalt alloy powder; and

(c) cooling said alloy powder in a non-oxidizing atmosphere.

4,684,402
METHOD OF WASTE DISPOSAL, AND APPARATUS FOR THE SAME

Ernest S. Geskin, 21 Karen Pl., Edison, N.J. 08817, and Joseph W. Bozzelli, 79 E. McClelland Ave., Livingston, N.J. 07039

Continuation-in-part of Ser. No. 476,012, May 2, 1983. This application Dec. 31, 1985, Ser. No. 815,230
Int. Cl.[4] C21C *7/00*
U.S. Cl. 75—51.5 9 Claims



1. A method of waste disposal comprising the steps of

providing a vessel having at least two chambers;

depositing a melt in at least one of said chambers, the melt being selected from the group consisting of a metal, metal oxides and nonmetal oxides;

adding waste, air, oxygen, steam, fluxes, hot flue gases and slag into the melt;

maintaining the melt temperature and composition so as to ensure an absorption of oxygen and to thereby produce oxides, and reduction of the oxides produced during the absorption, by the added waste, and so as to ensure complete destruction of hazardous and offensive elements of the added waste;

generating gaseous, liquid amd solid products by waste pyrolysis and reaction between the waste and the melt;

continuously withdrawing the gaseous products as off-gases from the melt; and

retaining the liquid and solid products in the melt.

4,684,403

DEPHOSPHORIZATION PROCESS FOR MANGANESE-CONTAINING ALLOYS

Young E. Lee, Youngstown; James H. Downing, Clarence, and Robert H. Kaiser, Youngstown, all of N.Y., assignors to Elkem Metals Company, Pittsburgh, Pa.

Filed Jun. 19, 1986, Ser. No. 876,245

Int. Cl.[4] C22B *47/00*; C21C *7/02*

U.S. Cl. 75—80 **26 Claims**

1. A method for dephosphorizing a ferromanganese melt comprising:

(a) forming a melt ferromanganese; and

(b) adding to said melt a magnesium compound to dephosphorize said melt.

4,684,404

DISSOLUTION OF NOBLE METALS

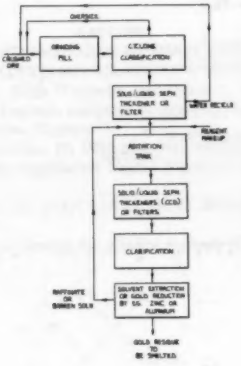
Guy I. Z. Kalocsai, Armidale, Australia, assignor to Kaljas Pty. Limited, North Sydney, Australia

Continuation of Ser. No. 628,371, Jul. 6, 1984, abandoned. This application Oct. 4, 1985, Ser. No. 784,463

Claims priority, application Australia, Jul. 8, 1983, PG0202

Int. Cl.[4] C01G *7/00*; C22B *11/04*

U.S. Cl. 75—118 R **19 Claims**



1. A process of dissolving metallic gold or removing metallic gold from a gold-containing material comprising the steps of:

(a) contacting metallic gold or a gold-containing material with an aqueous bromine-based composition comprising:

at least one source of cations, which source is able to highly dissociate in the solution, said source being a strong base or producing in solution at least one cation selected from the group consisting of sodium, potassium, ammonium, ferric and lithium ions; a halogen source capable of liberating an effective amount of bromine in a concentration of not more than 5 wt %; and

sufficient acid or base such that the pH of the composition in contact with said gold is in the range of 5.6 to 8.5,

to dissolve the gold in the aqueous composition; and

(b) recovering the dissolved gold from the aqueous composition.

4,684,405

SINTERED TUNGSTEN CARBIDE MATERIAL AND MANUFACTURING METHOD

Johannes Kolaska, Bottrop, and Norbert Reiter, Mettmann, both of Fed. Rep. of Germany, assignors to Fried. Krupp GmbH, Essen, Fed. Rep. of Germany

Filed Mar. 28, 1986, Ser. No. 845,589

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1985, 3511220

Int. Cl.[4] C22C *29/08*

U.S. Cl. 75—240 **10 Claims**

1. A method for manufacturing a sintered tungsten carbide material, comprising:

combining metal particles composed of: from 75 to 95 percent by weight of a composition containing at least 70 percent by weight of tungsten carbide; and from 5 to 25 percent by weight of a binder metal composition, the binder metal composition consisting essentially of from 5 to 15 percent by weight of chromium and from 85 to 95 percent by weight of nickel;

pressing the metal particles into a pressed body;

sintering the pressed body in a sintering chamber for a period ranging from 20 to 200 minutes, at a temperature ranging from 1400° to 1500° C., and in a protective atmosphere which is one of a vacuum, a noble gas, a mixture of noble gases, and hydrogen gas to form a sintered body; and

treating the sintered body for a period ranging from 20 to 200 minutes, at a temperature ranging from 1300° to 1400° C., at a pressure ranging from 20 to 3000 bar, and in a noble gas atmosphere.

4,684,406

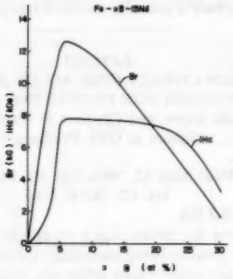
PERMANENT MAGNET MATERIALS

Yutaka Matsuura, Ibaraki; Masato Sagawa, Nagaokakyo, and Setsuo Fujimura, Kyoto, all of Japan, assignors to Sumitomo Special Metals Co., Ltd., Osaka, Japan

Division of Ser. No. 532,517, Sep. 15, 1983, Pat. No. 4,597,938. This application Jun. 30, 1986, Ser. No. 880,018

Int. Cl.[4] C22C *29/14*

U.S. Cl. 75—244 **1 Claim**



1. A sintered permanent magnetic material of the Fe-B-R type, said sintered permanent magnetic material being prepared from a compacted metallic powder having a particle size of 0.3–80 microns and a composition consisting essentially of by atomic percent, 12.5–20% R wherein R is at least one rare earth element including Y and at least 50% of R consists of Nd and/or Pr, 4–20% B, and the balance Fe with impurities wherein the sintered permanent magnetic material has a maximum energy product of at least 20 MGOe and has a density which is at least 95% of the theoretical density of the material.

4,684,407

HYDRAULIC CEMENT COMPOSITION AND PROCESS FOR PRODUCING CEMENT SHAPINGS

Norihiro Umezawa, 8-9, Azaohara, Oda, Kakuda-shi, Miyagi, and Kazuyuki Hata, Mie, both of Japan, assignors to Mitsubishi Yuka Fine Chemicals Co., Ltd., Tokyo and Norihiro Umezawa, Kakuda, both of, Japan

Filed Nov. 8, 1985, Ser. No. 796,065
Claims priority, application Japan, Nov. 14, 1984, 59-240099
Int. Cl.[4] C04B *24/20*
U.S. Cl. 106—90 10 Claims

1. A process for producing a shaped cement product, comprising:

(i) providing a hydraulic cement composition consisting essentially of (1) 100 parts by weight of cement, (2) optionally, an amount of fine aggregate, (3) optionally, an amount of a coarse aggregate, (4) an amount of water and (5) 2 to 20 parts by weight of an additive having the following composition:

(a) 1 part by weight of at least one sulfate selected from the group consisting of sulfuric acid salts of aluminum and sulfuric acid complex salts of aluminum,

(b) 0.1 to 1 part by weight of a water reducing agent selected from the group consisting of a condensation product of sodium naphthalenesulfonate and formalin, a condensation product of melamine resin sodium sulfonate and formalin, a condensation product of calcium maphthalenesulfonate and formalin, and a condensation product of melamine resin calcium sulfonate and formalin, and

(c) 0 to 5 parts by weight of a particulate silicic compound selected from the group consisting of Akakura pozzolan, having a particle size of 1 to 50 μm, and $Al_2O_3.3SiO_2$, $ZrSiO_4$, diatomaceous earth, bentonite, quartz sand, kaolin, CaSi dust, silica fume and $Na_2O.SiO_2$, each having a particle size of no more than 5 μm,

(ii) placing said hydraulic cement composition in a framework; and

(iii) curing the composition at a temperature between 80° C. and 100° C. at a temperature elevation rate of at least 40° C./hr.

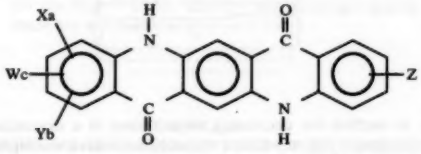
4,684,408

SILANATED QUINACRIDONE DYES AND COMPOSITE PIGMENTS

Antonio Marraccini; Filippo M. Carlini; Antonio Pasquale, and Michele Pontevivo, all of Novara, Italy, assignors to Montedison S.p.A., Milan, Italy

Division of Ser. No. 683,133, Dec. 18, 1984. This application Feb. 28, 1986, Ser. No. 834,787
Claims priority, application Italy, Dec. 27, 1983, 24386 A/83
Int. Cl.[4] C09C *1/36*
U.S. Cl. 106—300 6 Claims

1. A composite pigment consisting of a heterocyclic compound containing at least one silane group having the formula:



wherein

X is an $—SO_2NHR$ group, where R is an alkyl group, linear or branched, having from 1 to 6 carbon atoms, a cycloalky group, a phenyl group optionally substituted by one or more alkyl or alkoxy groups (C_1–C_6), a halogen;

Y and Z indicate a silane group having the formula:

$$—SO_2—NH—(CH_2)_a—Si—(R_1)_m(OH)_{p-m}$$
$$\qquad\qquad\qquad\quad |$$
$$\qquad\qquad\qquad (R_2)_q$$

wherein R_1 is an alkoxy group (C_1–C_2), R_2 is an alkyl group (C_1–C_4) or a phenyl group; n is 3, 4 or 5; q is 0 or 1; p and m are integers, such that when q is 1, p is 2 and m is 0, 1 or 2, and when q is 0, p is 3 and m is 0, 1, 2 or 3; W indicates an $—SO_3H$ group; a, b and c are 0 or 1, selected in such a way that the sum a+b+c is equal to 1, chemically grafted on an inorganic substrate by chemical siloxanic bonds.

4,684,409

SOLVENT SYSTEM COMPRISING N-ALKYL SUBSTITUTED AMIDE AND QUATERNARY AMMONIUM COMPOUND

James D. Hodge, Midlothian, and Kiu-Seung Lee, Richmond, both of Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 17, 1986, Ser. No. 819,595
Int. Cl.[4] C08K *5/16, 5/20*
U.S. Cl. 106—311 4 Claims

1. A solvent system for use in solution polymerization of aromatic polyamides comprising: (a) an N-alkyl-substituted amide selected from the group consisting of N-methyl pyrrolidone, dimethyl acetamide, and tetramethyl urea and (b) an effective amount of a quaternary ammonium compound selected from the group consisting of methyl tri-n-butylammonium chloride, methyl tri-n-propyl ammonium chloride, tetra-n-butylammonium chloride, and tetra-n-propyl ammonium chloride.

4,684,410

LOW D.E. STARCH HYDROLYZATES

Alpha L. Morehouse, and Pamela A. Krone, both of Muscatine, Iowa, assignors to Grain Processing Corporation, Muscatine, Iowa

Division of Ser. No. 419,218, Sep. 17, 1982, abandoned. This application Nov. 4, 1985, Ser. No. 794,704
Int. Cl.[4] C13K *1/06*
U.S. Cl. 127—40 5 Claims

1. A process for producing a starch hydrolyzate product having a measurable dextrose equivalent value of up to about 7.72 which comprises treating an aqueous slurry of non-waxy starch with an acid or enzyme to liquefy the starch and to provide an aqueous dispersion substantially free of residual starch granules with a measurable dextrose equivalent value of up to about 3, then treating the said dispersion with a bacterial alpha-amylase at a temperature from about 95° C. to 100° C. and a pH of from about 6.5 to 8 to produce said starch hydrolyzate product having a measurable dextrose equivalent value of up to about 7.72, stopping said bacterial alpah-amylase action and recovering said starch hydrolyzate having a measurable dextrose equivalent value of up to about 7.72.

4,684,411

METHOD FOR FINISHING STEEL SHAPES WITH MAGNETITE AND PRODUCT OBTAINED THEREFROM

Hawk Johnsen, 2313 Lakeshore Blvd. West, Apt. 913, Toronto, Ontario, Canada (M8V 1A8), and Kaare Johnsen, 1360 Whiteoaks Blvd., Apt. 1108, Oakville, Ontario, Canada (L6H 2R7)

Filed Nov. 18, 1985, Ser. No. 799,137
Claims priority, application Canada, Nov. 21, 1984, 468342
Int. Cl.[4] B08B *1/02, 7/00, 30/00;* C03C *23/00*
U.S. Cl. 134—15 16 Claims

1. A method for oxidatively heat treating the outer surface of a steel welding wire suitable for use as an electrode in MIG of arc welding, comprising:

cleaning the surface;

subjecting the cleaned surface to a heated atmosphere having at least about the oxygen content of air, said atmosphere being heated to a range of about 300° C. to about 800° C.; and

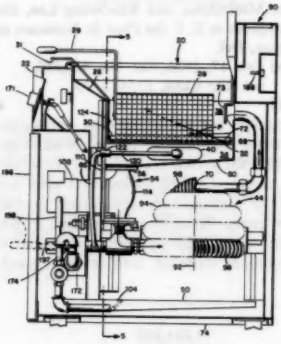
removing the cleaned surface from said heated atmosphere upon oxidation of the surface to a depth of about 0.5 to about 2.5 microns.

4,684,412

CLEANING AND DRYING APPARATUS AND METHOD FOR THE RECIRCULATION SYSTEM OF A HIGH EFFICIENCY DEEP FAT FRYER

Donald E. Fritzsche, Chicago Heights, Ill., assignor to Hobart Corporation, Troy, Ohio

Filed Aug. 8, 1985, Ser. No. 763,500
Int. Cl.[4] B08B *7/00*
U.S. Cl. 134—19 **17 Claims**



7. In a deep fat fryer having a tank for holding cooking fat, a fat recirculating system in fluid communication with the tank and comprising tubing located exteriorly of said tank and having an inlet adjacent the bottom of said tank, a return outlet to said tank and a recirculating pump and motor below and adjacent said inlet, said tubing and tank forming a closed-loop path for recirculating fat during cooking and cleaning liquid and rinse water and during cleaning, a drain valve in said tubing adjacent a lowermost portion thereof for draining said tank and tubing, a heat exchanger encompassing a portion of said tubing, a burner for delivering heat to said heat exchanger and thereby to liquid in said tubing, and control means including thermostatic means for controlling said pump motor and burner to an activated condition during cooking to supply heated fat to said tank and to maintain the fat therein at a preselected cooking temperature and to a deactivated condition when said cooking temperature has been reached, the improvement comprising:

second control means for cleaning, rinsing and drying said tank and tubing after fat has been removed therefrom, including

a. first switch means and circuitry for energizing said pump motor and operating said burner during circulation of a cleaning liquid,

b. a thermostat for maintaining liquid at a predetermined temperature below the boiling point of water during cleaning fluid recirculation,

c. a second switch and circuitry for energizing said pump motor independently of said burner during circulation of rinse water after said cleaning fluid has been drained,

d. a timer for alternately activating and deactivating said burner to dry water droplets contained in said tubing after said rinse fluid has been removed, and

e. third switch means for energizing said timer, and means for maintaining said timer energized for a time period corresponding to the time required to essentially dry said tubing.

13. The method of operating a deep fat fryer having a tank for holding cooking fat, a fat recirculating system in fluid communication with the tank and comprising tubing located exteriorly of said tank and having an inlet adjacent the bottom of said tank, a return outlet to said tank and a recirculating pump and motor below and adjacent said inlet, said tubing and tank forming a closed-loop path for recirculating fat during cooking and cleaning liquid and rinse water during cleaning, a drain valve in said tubing adjacent a lowermost portion thereof for draining said tank and tubing, a heat exchanger encompassing a portion of said tubing, a burner for delivering heat to said heat exchanger and thereby to liquid in said tubing, and first control means including thermostatic means for controlling said pump motor and burner to an activated condition during cooking to supply heated fat to said tank to maintain the fat therein at a preselected cooking temperature and to a deactivated condition when said cooking temperature has been reached, said method comprising:

draining the fat from the tank and tubing through said drain valve,

filling the tank and tubing with a cleaning liquid, and recirculating and draining said cleaning liquid,

filling the tank and tubing with rinse water, and recirculating, heating, and finally draining the rinse water therefrom, the improvement consisting of:

thereafter intermittently activating and deactivating said burner for a time period to convert water droplets in said tubing into steam for escape therefrom to dry said tubing internally, and

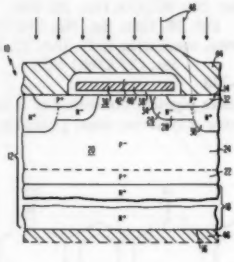
discontinuing burner operation after a time period corresponding to the normal time period required to dry said tubing.

4,684,413

METHOD FOR INCREASING THE SWITCHING SPEED OF A SEMICONDUCTOR DEVICE BY NEUTRON IRRADIATION

Alvin M. Goodman, Princeton Township, Mercer County; Lawrence A. Goodman, Plainsboro; John P. Russell, Hopewell Township, Mercer County, and Paul H. Robinson, Lawrence Township, Mercer County, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Oct. 7, 1985, Ser. No. 784,726
Int. Cl.[4] H01L *21/265, 27/02*
U.S. Cl. 437—17 **11 Claims**



1. A method for decreasing turnoff time in a crystalline semiconductor region within a semiconductor device comprising the steps of:

providing pinning centers, at a density greater than 0.1 ppma, in the semiconductor region;

irradiating the region so as to yield crystal damage that is equivalent to or greater than irradiating with 1 MeV neutrons at a fluence greater than approximately 10^{13} cm^{-2}; and

annealing the region at approximately 350°–450° C. for approximately 15 minutes to 1 hour so as to yield a density of stable recombination centers correlating with the pinning centers that provide a stable minority carrier lifetime within the region.

4,684,414

HIGH DAMPING CAPACITY ALLOY AND A PROCESS FOR PRODUCING THE SAME

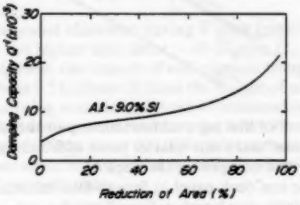
Hakaru Masumoto; Showhachi Sawaya, and Masakatsu Hinai, all of Sendai, Japan, assignors to The Foundation: The Research Institute of Electric and Magnetic Alloys, Sendai, Japan

Continuation of Ser. No. 286,624, Jul. 24, 1981, abandoned, which is a continuation-in-part of Ser. No. 180,563, Aug. 25, 1980, abandoned. This application Nov. 15, 1983, Ser. No. 551,902

Claims priority, application Japan, Sep. 5, 1979, 54-112762

Int. Cl.[4] C22F *1/04*

U.S. Cl. 148—11.5 R 4 Claims



1. A process for producing a damping alloy having a high damping capacity, comprising:

heating an alloy consisting of 1–20% by weight of silicon, 0.1–15% by weight of iron, 0.1–50% by weight in total of at least one subingredient selected from the group consisting of less than 50% by weight of lead and antimony, less than 40% by weight of germanium and cerium, less than 20% by weight of nickel, less than 15% by weight of cobalt, niobium and zirconium, less than 10% by weight of titanium and calcium and less than 3% by weight of boron, and the remainder of aluminum, at a temperature higher than 250° C. and lower than its melting point for 5 minutes to 500 hours to achieve homogeneity of said alloy;

cooling at a cooling rate of 200° C./sec to 1° C./hr to maintain said homogeneity;

subjecting to a cold working with a reduction of area of at least 5%; and

reheating said alloy sufficiently to facilitate subsequent forming at a temperature of less than 250° C. for more than 1 minute to less than 100 hours and then cooling at a rate of not less than 1° C./hr, whereby said damping capacity is made not less than 6×10^{-3}.

4,684,415

CORE ANNIHILATION METHOD OF $HG_{1-x}CD_xTE$

John H. Tregilgas, Richardson, and Thomas L. Polgreen, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 18, 1985, Ser. No. 789,231

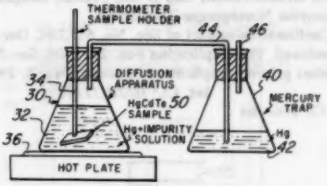
Int. Cl.[4] H01L *21/388*

U.S. Cl. 437—228 20 Claims

1. A method of core annihilation for a $Hg_{1-x}Cd_xTe$ substrate, comprising the steps of:

(a) providing a $Hg_{1-x}Cd_xTe$ substrate,

(b) providing a reservoir of heated mercury, and



(c) immersing said substrate in said heated reservoir for a period of time sufficient to annihilate the core of said substrate.

4,684,416

ALLOY WITH SMALL CHANGE OF ELECTRIC RESISTANCE OVER WIDE TEMPERATURE RANGE AND METHOD OF PRODUCING THE SAME

Hakaru Masumoto, and Naoji Nakamura, both of Sendai, Japan, assignors to The Foundation: The Research Institute of Electric and Magnetic Alloys, Sendai, Japan

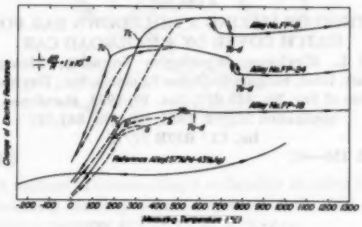
Continuation of Ser. No. 437,613, Oct. 29, 1982, Pat. No. 4,518,439. This application Mar. 7, 1985, Ser. No. 709,327

Claims priority, application Japan, Dec. 14, 1981, 56-200065

The portion of the term of this patent subsequent to May 21, 2002, has been disclaimed.

Int. Cl.[4] C22F *1/14*

U.S. Cl. 148—430 5 Claims



1. An electric resistance alloy consisting essentially of 59.0–88.0 wt % of palladium and the remainder of iron, said alloy having a temperature coefficient of electric resistance with an absolute value smaller than 100 ppm/° C. over a temperature range of 490° C. to 1340° C. and being in an ordered state at room temperature, prepared by:

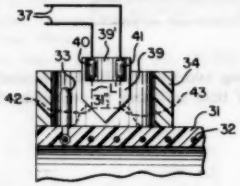
melting in a non-oxidizing atmosphere an alloy consisting essentially of 59.0–88.0 wt % of palladium and the remainder of iron; molding the melt of said alloy in a mold; quenching the molded alloy from a temperature higher than the order-disorder transformation point thereof but lower than the melting point thereof to room temperature; cold working the quenched alloy into a desired form; and annealing the shaped alloy by heating in a non-oxidizing atmosphere at a temperature higher than the order-disorder transformation point thereof but lower than the melting point thereof for a duration longer than 2 seconds but shorter than 100 hours and cooling at a rate of 5°–300° C./hour.

4,684,417

PROCESS FOR THE CONTROL OF THE WELDING TIME OF AN ELECTRICAL WELDED UNION

Gérard Grandclement, Cap D'Ail, France, assignor to Societe Anonyme Nomegasgne Toutlectric

Continuation-in-part of Ser. No. 677,194, Dec. 3, 1984, abandoned. This application Sep. 25, 1986, Ser. No. 911,401
Claims priority, application Monaco, Dec. 2, 1983, PV1677
Int. Cl.[4] B32B *31/26*
U.S. Cl. 156—64 **5 Claims**



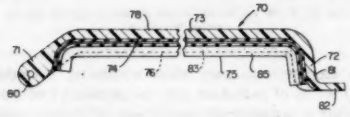
1. A process of uniting by welding two members a thermoplastic insulating material which comprises bringing the two members together with contiguous surfaces in a zone to be welded, providing a resistive electrical current path in said members in an inner weld zone adjacent said contiguous surfaces, passing electrical current through said electrical current path to heat the material of said members to welding temperature in said inner weld zone only while leaving enveloping outer portions of said members at lower temperature, providing in one of said members a space into which said material heated to welding temperature can expand, providing means for sensing the expansion of said material heated to welding temperature into said space and means controlled by said sensing means for cutting off supply of electrical current to said current path when predetermined welding temperature is reached.

4,684,418

METHOD OF MAKING A HOLDDOWN BAR FOR A HATCH COVER OF A RAILROAD CAR

Donald L. Kleykamp, Washington Township, Montgomery County, Ohio, assignor to Dayco Products, Inc., Dayton, Ohio

Division of Ser. No. 459,067, Jan. 19, 1983, abandoned. This application May 9, 1986, Ser. No. 861,167
Int. Cl.[4] B32B *31/16*
U.S. Cl. 156—91 **6 Claims**



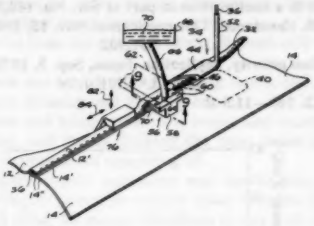
1. In a method of making a holddown bar for a hatch cover of a railroad car, said method comprising the steps of molding said holddown bar from polymeric material so as to have opposed ends one of which is adapted to be pivotally mounted to said car and the other of which is adapted to be releasably latched to said car while a medial portion thereof intermediate said opposed ends is adapted to extend across said hatch cover and carry a sealing gasket means in a channel means thereof that engages against said hatch cover, forming said channel means to be defined by a surface means of said holddown bar, disposing adhesive means in said channel means, and then securing said gasket means to said surface means with said adhesive means that is disposed between said surface means and said gasket means, the improvement comprising the steps of forming interlocking means to be carried by said holddown bar, mechanically interlocking a first part of said interlocking means to said holddown bar by molding said first part in said holddown bar as said holddown bar is being molded, and then mechanically interlocking a second part of said interlocking means to said adhesive means when said adhesive means is being disposed in said channel means to thereby mechanically interlock said adhesive means to said holddown bar.

4,684,419

METHOD AND APPARATUS FOR FORMING AUTOMOBILE CONVERTIBLE TOPS

Roy P. Agosta, Mission Hills, Calif., assignor to Robbins Auto Top Co., Inc., Santa Monica, Calif.

Filed Jul. 3, 1986, Ser. No. 881,601
Int. Cl.[4] B32B *31/12, 7/08*
U.S. Cl. 156—93 **20 Claims**



1. A method of making a convertible top or the like having a top deck panel and a side quarter panel of fabric-based material, said method comprising the steps of:

sewing the top deck panel in face-to-face relation with the side quarter panel with a line of stitches generally near substantially overlying side margins of said panels;

folding a portion of the overlying panels along the sewn side margins back upon itself with said side quarter panel defining a directly overlying pair of side edge strips in stacked relation between a marginal edge of said top deck panel sewn to one of said side edge strips and the remainder of said top deck panel;

feeding an elongated rod generally into the base of the fold defined by the folded portion of said overlying panels and between said side edge strips;

applying an adhesive material in a substantially uninterrupted film between said side edge strips;

pressing said side edge strips together with the adhesive material therebetween to lock said rod in place;

unfolding said remainder of said top deck panel leaving the marginal edge thereof in stacked relation with said side edge strips; and

bonding said top deck panel to said one of said side edge strips, whereby said side edge strips cooperate with said rod to define an elongated raised bead which cooperates in turn with an adjacent region of said top deck panel to define an elongated rain drainage gutter.

7. A system for making a convertible top or the like having a top deck panel and a side quarter panel of fabric-based materials, said system comprising:

means for sewing the top deck panel in face-to-face relation with the side quarter panel generally along substantially overlying side margins of said panels;

means for folding a portion of the overlying panels along the sewn side margins back upon itself with said side quarter panel defining a directly overlying pair of side edge strips in stacked relation between a marginal edge of said top deck panel sewn to one of said side edge strips and the remainder of said top deck panel, said folding means including means for feeding an elongated rod generally into the base of the fold defined by the folded portion of said overlying panels and between said side edge strips;

means for applying an adhesive material in a substantially uninterrupted film between said side edge strips;

means for pressing said side edge strips together to lock said rod in place; and

means for bonding said top deck panel marginal edge to said one of said side edge strips, whereby said side edge strips cooperate with said rod to define a raised bead which cooperates in turn, when said remainder of said top deck panel is unfolded from said side quarter panel, with an adjacent region of said top deck panel to define an elongated rain drainage gutter.

4,684,420

POLYMER TRANSFER DECALS COMPRISING SATURATED ELASTOMERS

Lynn A. Bryant, Canton; Durward T. Roberts, Jr., Fairlawn; Joseph A. Beckman, Akron; Joseph H. Tazewell, Akron, and James F. Cetnar, Akron, all of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Aug. 16, 1985, Ser. No. 766,228

Int. Cl.[4] B29B *17/00;* **B41M** *3/12, 5/00;* **B60C** *13/00*

U.S. Cl. 156—116 **9 Claims**

1. A transfer decal having high resistance to ultraviolet light and ozone and having adherence to tire sidewalls, said decal comprising:

(a) a saturated elastomer having a glass transition temperature not higher than about −40 degrees C.;

(b) a pigment, the amount of said pigment being in the range of about 0.5 to about 10 times the weight of said elastomer, said decal being essentially devoid of unsaturation and free of staining and antiozonants, and forming a film having a flexural durability of at least about 100,000 cycles at room temperature and at least about 80,000 cycles at −40° C. when flexed at 5 Hz and a 15 percent strain.

4,684,421

ADHESION OF RUBBER TO METALS

Philip E. R. Tate, Stockport, England, assignor to Manchem Limited, Manchester, England

Division of Ser. No. 689,191, Jan. 7, 1985, Pat. No. 4,588,766. This application Jan. 21, 1986, Ser. No. 820,033

Claims priority, application United Kingdom, Jan. 10, 1984, 8400572

Int. Cl.[4] B60C *9/02, 9/14;* **C08K** *5/55;* **B32B** *15/08*

U.S. Cl. 156—124 **12 Claims**

1. The method of promoting the adhesion of rubber to metal during vulcanization which comprises incorporating a promoter comprising the reaction product of an alkaline earth borate and a cobalt or nickel carboxylate in the rubber skim stock prior to vulcanization.

4,684,422

TRANSFER APPARATUS FOR TIRE CARCASSES AND TIRE BANDS

John K. Roedseth, Bissen, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 3, 1985, Ser. No. 771,967

Int. Cl.[4] B29D *30/08*

U.S. Cl. 156—126 **12 Claims**

1. A method of transporting a cylindrical tire carcass component in which there is utilized a transfer apparatus having a hollow housing with two axially spaced annular sealing and gripping bladders mounted thereon, said method comprising the steps of

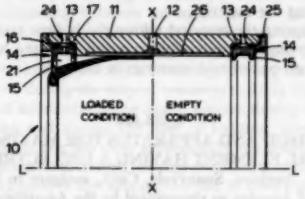
(a) locating the housing concentrically with a cylindrical tire component on a first cylindrical drum,

(b) introducing air pressure into the bladders to cause them to expand radially inwards to grip and seal against the outer surface of the component,

(c) removing air from the annular space between the component, the inner surface of the housing, and the two bladders and then releasing the component from the drum,

(d) transporting the component to and placing it concentrically around a second cylindrical drum,

(e) collapsing the bladders radially outwardly by reducing



the air pressure therein then releasing the vacuum from around the component to deposit the component on the drum, and

(f) removing the housing from the drum.

4,684,423

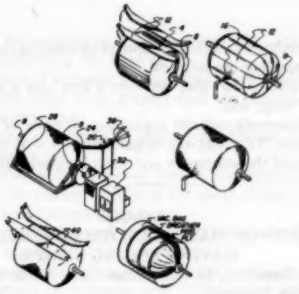
METHOD FABRICATING A COLLAPSIBLE MANDREL STRUCTURE TO BE USED IN MANUFACTURING REINFORCED HOLLOW TANKS

John C. Brooks, West Valley City, Utah, assignor to Edo Corporation/Fiber Science Division, Salt Lake City, Utah

Filed Feb. 10, 1986, Ser. No. 828,213

Int. Cl.[4] B65H *81/02*

U.S. Cl. 156—156 **27 Claims**



1. A method of constructing a collapsible mandrel for using in fabricating filament wound vessels or tanks, said method comprising the steps of

(a) preparing a rigid mandrel and supporting the mandrel on a rotatable axle,

(b) applying a first layer of strips of rubber longitudinally on the mandrel to form an enclosure with oppositely disposed openings coincident with the axle,

(c) applying a coat of rubber solution substantially uniformly over the strips of rubber,

(d) winding fibers onto the coat of rubber solution,

(e) applying a second layer of strips of rubber longitudinally over the fibers,

(f) curing the rubber layers,

(g) cutting the rubber layers circumferentially into two parts and separating the parts from the rigid mandrel,

(h) rejoining said two parts along the cut made in step (g),

(i) bonding said two parts together by placing and curing strips of rubber over the seam separating said two parts on the outside and inside of the seam, to form the collapsible mandrel.

22. A method of fabricating a hollow tank using the collapsible mandrel of claim 1 comprising the steps of

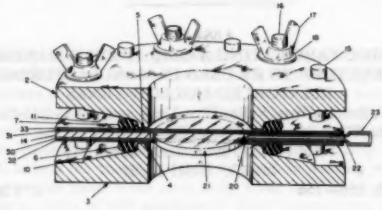
(o) supporting the collapsible mandrel on a winding machine so that the mandrel is distended,
(p) placing a layer of material on the exterior of the collapsible mandrel to form a hollow tank with openings at opposite ends thereof,
(q) curing the material,
(r) collapsing the mandrel within the hollow tank, and
(s) removing the collapsible mandrel from the hollow tank through one of said openings in the tank.

4,684,424

METHOD AND APPARATUS FOR MAKING AN OPTICAL ELEMENT HAVING A DIELECTRIC FILM

Gordon C. Augason, Sunnyvale, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Aug. 15, 1985, Ser. No. 765,981
Int. Cl.[4] B32B *17/00*
U.S. Cl. 156—163 **30 Claims**



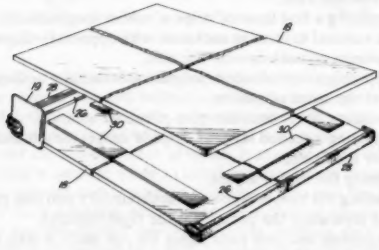
1. A method of making an optical element having a dielectric film comprising the steps of:
sandwiching said film between a first and a second elastic "O" ring; and
simultaneously radially expanding all parts of said first and second "O" rings to a larger diameter with said film sandwiched therebetween and stretching said film.

4,684,425

METHOD OF MAKING CLOTH COVERED PANELS HAVING EDGING STRIPS

Brian C. Bannister, 14 Hawkshead Lane, North Mimms, Hertfordshire, England

Filed Aug. 13, 1985, Ser. No. 765,312
Claims priority, application United Kingdom, Aug. 16, 1984, 8420858; Feb. 19, 1985, 8504208
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—216 **5 Claims**



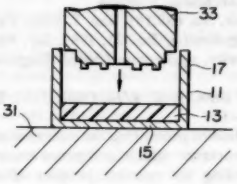
1. A method of making a panel comprising two sheets of a substantially rigid material and two lengths of edging strip each including a body part which defines a channel extending along the strip, each edging strip further including a tongue extending along the strip and projecting from said body part, on the side of the body part remote from that on which said channel opens, said two sheets of a substantially rigid material being superimposed and having sandwiched therebetween said tongues of said edging strips the method comprising adhesively securing to one face of a first one of said two sheets of substantially rigid material, along each of at least two opposing sides of said first sheet, one face of a said tongue of a respective said edging strip, fitting the second of said two sheets of substantially rigid material over the first said sheet and in register therewith, so that two opposing sides of the second sheet also lie along said edging strips, spacing the base of the channel of each edging strip from the adjacent edges of at least one of said sheets a small distance to form a slot therebetween, subsequently adhesively bonding to the other face of said at least one of said sheets, which forms an outer face of the panel, a piece of flexible sheet covering material, which is initially so applied that said piece projects, at its edges beyond the edges of said sheets of substantially rigid material, each marginal edge portion being then fixed in place by a process which includes the steps of injecting a liquid adhesive into the slots between the base of the channel of each edging strip and the adjacent edge of said at least one of said rigid sheets, and subsequent tucking into the adhesive-occupied slots, by means of a thin-bladed tool, the respective marginal edge of said piece of flexible sheet material.

4,684,426

METHOD OF MANUFACTURING A CONTAINER CAP WITH A CONCEALED MARK

Hajime Takayama, Edogawa, Japan, assignor to Shibazaki Seisakusho Ltd., Japan

Filed Jul. 2, 1985, Ser. No. 751,086
Int. Cl.[4] B32B *31/20*
U.S. Cl. 156—220 **7 Claims**



1. A method of manufacturing a container cap having a mark concealed therein, the cap including a panel portion and a skirt portion depending from the periphery of the panel portion, the method comprising:
(a) providing the mark to a central portion of one of both the inside face of the panel portion and one side of a disk-shaped seat member made of a thermoplastic material;
(b) then, placing the seat member over the inside face of the panel portion so that the one side of the seat member faces the inside face of the panel portion, the diameter of the seat member being substantially equal to the inner diameter of the skirt portion;
(c) softening the seat member placed over the inside face of the panel portion by heating the seat member; and
(d) after or simultaneously with the step (c), depressing the other side of the seat member for forming an annular manually tearable line in the other side of the seat member, thereby defining in the seat member a gasket portion outside the tearable line and a manually removable portion, overlying the mark, inside the tearable line, and for attaching the gasket portion to the panel portion.

4,684,427

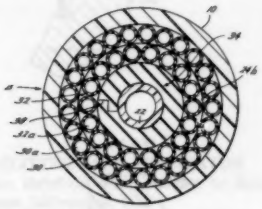
METHOD OF FORMING AN IMPROVED HOSE BUNDLE

Earl D. Abernathy, Magnolia, Tex., assignor to Multiflex, Inc., Houston, Tex.

Continuation of Ser. No. 583,669, Feb. 27, 1984, abandoned. This application Dec. 6, 1985, Ser. No. 807,102

Int. Cl.⁴ B29C *47/02*

U.S. Cl. 156—244.12 **8 Claims**



1. A method of forming a unitized bundle of conduits comprising the steps of:

providing a substantially cylindrical inner core having a predetermined diameter;

disposing about the inner core an inner sleeve having a predetermined thickness;

disposing about said inner sleeve an annular row of closely positioned adjacent conduits, each conduit having substantially the same diameter to provide an assembly having a substantially cylindrical outer shape;

predetermining the thickness of said inner sleeve based upon the member of the conduits in said annular row and their individual diameters relative to the diameter of the inner core so as to fill the cylindrical area between the inner core and the inner surfaces of said conduits with said inner sleeve when said conduits are disposed in said annular row adjacent to each other in the substantially cylindrical outer shape; and

providing an outer substantially cylindrical sleeve about said conduits for unitizing the core and conduits in a conduit bundle.

4,684,428

METHOD OF MAKING A FUSION PAD

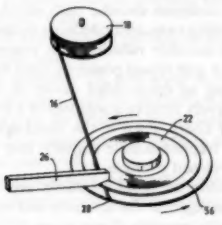
A. T. E. Ewen, Nazeing, and J. P. Stone, Welwyn Garden City, both of United Kingdom, assignors to Glynwed Tubes and Fittings Limited, Sheldon, United Kingdom

Continuation of Ser. No. 613,517, May 23, 1984, abandoned. This application Jan. 28, 1986, Ser. No. 823,819

Claims priority, application United Kingdom, Apr. 27, 1984, 8410765

Int. Cl.⁴ B32B *31/18*

U.S. Cl. 156—257 **5 Claims**



1. A method of producing a thermoplastic fusion pad for fusion to a convex thermoplastic surface, the method comprising the steps of:

forming in one substantially flat surface of the pad, which is to be fused to the convex surface and which is opposite a surface of the pad having terminals, a continuous spiral groove extending between an inner and an outer end, rotating the pad, locating in the groove an electrically conductive wire having a diameter less than the depth of the groove during the step of rotating, holding the wire in the groove during the step of rotating, melting the upper portion of substantially the entire groove during the step of rotating and during the step of holding, wiping the melted upper portion over substantially the length of the wire in the groove during the step of rotating to retain the wire in the groove and shaping the pad to have a predetermined, curved, shape in which the one surface of the pad is concave for seating on the convex surface.

4,684,429

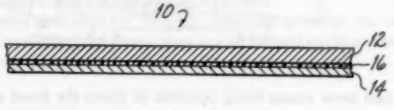
METHOD OF MAKING A LAMINATED PRINTING PLATE

Edward L. Dalton, Jr., 602 N. Willow, Tampa, Fla. 33606

Filed Jun. 19, 1984, Ser. No. 622,208

Int. Cl.⁴ B32B *31/12*

U.S. Cl. 156—323 **8 Claims**



1. A method for producing a photoengravable, laminated printing plate, comprising the steps of:

providing a sheet of etchable magnesium having a thickness approximately equal to or greater than the desired relief upon photoengraving;

providing a sheet of steel to be laminated with the sheet of etchable magnesium;

applying a homogenous adhesive free of non-compressible materials to the mating surface of the sheet of steel or the sheet of etchable magnesium;

mating the mating surfaces of the sheets of steel and etchable magnesium together;

providing a pair of equalizing sheets and positioning the equalizing sheets on opposing sides of the mated sheets of magnesium and steel;

placing the mated sheets of steel and etchable magnesium into a press;

operating the press to compress the mated sheets of steel and etchable magnesium until the adhesive is uniformly dispersed therebetween; and

removing the compressed mated sheets of steel and etchable magnesium from the press after curing of the adhesive.

4,684,430

APPARATUS FOR FUSIBLY INTERCONNECTING THERMOPLASTIC PIPES

Takayuki Handa; Yasushi Takeuchi; Masumi Kato, and Hisazi Seki, all of Tokyo, Japan, assignors to Mitsui Petrochemical Industries, Tokyo, Japan

Filed Jun. 28, 1983, Ser. No. 508,403

Claims priority, application Japan, Jun. 29, 1982, 57-110673

Int. Cl.⁴ B29C *27/06*; G05G *5/02*

U.S. Cl. 156—366 **10 Claims**

1. Apparatus for fusibly interconnecting two pipes with a butt joint, comprising

a pair of clamp mechanisms for holding two pipes, one of said clamp mechanisms being supported for movement in an axial direction to permit the movement of one pipe toward the other pipe,

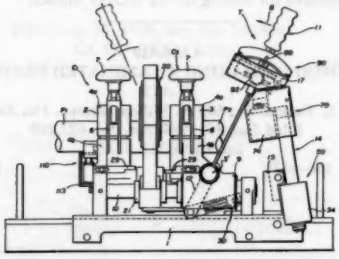
manually operated lever means operatively connected to one said clamp mechanism for moving said one clamp mechanism toward the other clamp mechanism,

means for providing a signal when the force applied by the lever to said one clamp mechanism is a preset value,

locking means operable in response to said signal to lock said lever in position,

heating means for engaging the ends of said pipes which are urged thereagainst by operation of the lever means, said locking means being operable to hold the pipes against said heating means,

timer means operable to unlock the lever after a preset period of time during which the ends of the pipes are fused,



said lever means being operable to move the fused ends of the pipes together to form a butt joint, said locking means being operable to hold the fused ends of the pipes together to form a butt joint therebetween, said timer means being operable to unlock the lever at the end of a preset period of time during which the butt joint has cooled,

compensating means for maintaining a force on the movable clamp mechanism to compensate for relative movement which occurs between the clamp mechanisms when the lever is locked, and

buffer means for absorbing impact and vibration resulting from the unlocking of the locking means.

4,684,431

APPARATUS FOR INTRODUCING APPLIQUES TO THE SIDEWALL OF A TIRE

Louis W. Shurman, and Lynn A. Bryant, both of Canton, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

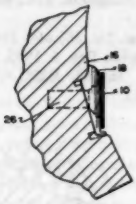
Filed Aug. 16, 1985, Ser. No. 766,388
Int. Cl.[4] B29C *33/16*
U.S. Cl. 156—394.1 **12 Claims**

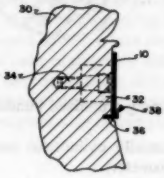
1. Apparatus for securing an applique to a tire, comprising:

a ring maintaining said applique thereon;

a tire curing mold for receiving the tire; and

a magnetized element within said mold for making forceful securing engagement with said ring, maintaining said ring





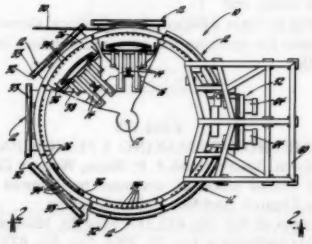
in a fixed position within said mold by magnetically attracting said ring to said magnetized element.

4,684,432

ROTARY MOLDING MACHINE

Wayne F. Allgaier, Utica; Gerard M. Tyjenski, Warren, and Claude A. Di Natale, Grosse Pointe Farms, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 1, 1983, Ser. No. 519,027
Int. Cl.[4] B32B *23/02*
U.S. Cl. 156—500 **3 Claims**



1. A machine for molding continuous fiber-reinforced plastic bodies, comprising

a horizontal turntable rotatable about a central vertical axis,

a plurality of molds carried by the turntable and rotatable with it in a common circular path about said axis, each mold comprising two cavity defining members at least one of which is movable radially with respect to said path between open and closed positions, such members of each mold defining an open-ended cavity so that each mold may successively receive a segment of a bundle of endless resin coated fibers when in the mold-open position and squeeze the trapped bundle segment into a desired shape in the mold-closed position,

means for rotating the mold turntable, and

a C-frame press adjacent the turntable and supported so as to be reciprocally movable along an arc of the circular mold path, the press comprising an anvil member, a ram member and hydraulic means for opening and closing said

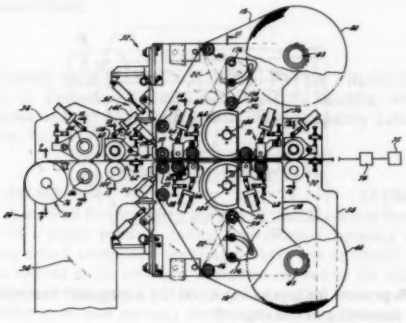
members and applying compressive force between them, the said anvil and ram members straddling the mold path and when open adapted to receive in turn each mold when it is closed and thereafter to close upon and compress the mold, the press being movable along said arc opposite the direction of turntable rotation to receive a mold and thereafter movable along the arc with the mold and turntable during press compression operation.

4,684,433

SLITTER TAPE APPLICATOR

Robert A. Gohr, Delafield, Wis., assignor to Kempsmith Machine Company, Milwaukee, Wis.

Filed Apr. 3, 1985, Ser. No. 719,885
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—517 **1 Claim**



1. An apparatus for forming file folder covers of the reinforced tape hinged type and the tape reinforced edge type said apparatus comprising

a base,

a guide roll assembly mounted on said base for guiding a pressboard web onto said base,

a slitter assembly mounted on said base for cutting a pair of slots in said web to define a reinforcing strip for a hinge reinforced file folder cover,

a first set of drive rolls for driving the web across the base,

a tape applicator assembly mounted on said base for selectively feeding different tapes onto said web, said assembly including a tape roll support assembly,

a first set of idler rolls for guiding a hinge tape onto said web,

a glue applicator assembly for applying glue to said first tape prior to application to said web,

a first set of pressure rolls for pressing said hinge tape into the slots in said web,

a second set of idler rolls for guiding an edge reinforcement tape onto said web,

a tape heater assembly for activating the adhesive on said reinforcement tape prior to application to said web,

means for varying the heating time of said heater,

a second set of pressure rolls for pressing said heat activated tape against said web,

a die for cutting said web into predetermined lengths,

a second pair of drive rolls for moving said web into said die, and

a second slitter assembly for cutting said predetermined lengths of pressboard into front and back covers.

4,684,434

METHOD FOR THE PREPARATION OF THIN LARGE-AREA SINGLE CRYSTALS OF DIACETYLENES AND POLYDIACETYLENES

Mrinal K. Thakur, Summit, N.J.; Sukant K. Tripathy, and Daniel J. Sandman, both of Acton, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Feb. 26, 1985, Ser. No. 705,587
Int. Cl.[4] C30G *1/12, 29/54, 29/58*
U.S. Cl. 156—622 **12 Claims**

1. A method for preparing thin large-area single crystals of a diacetylene monomer comprising:

forming a liquid layer containing molten pure diacetylene monomer represented by the formula

$$R—C{\equiv}C—C{\equiv}C—R'$$

wherein R and R′ are side groups selected such that the diacetylene monomer is polymerizable by a 1,4-addition solid state reaction upon exposure to actinic radiation between two clean, parallel, flat, smooth, opposed surfaces;

applying pressure of at least 0.5 psi to the liquid layer disposed between the two opposed surfaces; and

crystallizing the liquid layer disposed between the two opposed surfaces, while the liquid layer is kept under constant pressure of at least 0.5 psi, to form a thin large-area single crystal of diacetylene monomer;

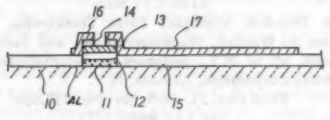
wherein the steps of forming, applying pressure to, and crystallizing the liquid layer are all carried out in an inert atmosphere.

4,684,435

METHOD OF MANUFACTURING THIN FILM TRANSISTOR

Kohhei Kishi; Mitsuhiro Koden, both of Nara, and Fumiaki Funada, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 13, 1986, Ser. No. 829,001
Claims priority, application Japan, Feb. 13, 1985, 60-27393; Feb. 13, 1985, 60-27394
Int. Cl.[4] H01L *21/306*; C23F *1/02*
U.S. Cl. 156—632 **1 Claim**



1. A process for manufacturing a thin film transistor comprising:

forming four layers by successively laminating on an insulation substrate a metal layer as a gate electrode, a first insulation layer as a gate insulation layer, a semiconductor layer and an electrode layer which makes an ohmic contact with said semiconductor layer,

etching said four layers by coating on a photoresist and developing it to form a pattern then applying etchant to etch said four layers in said pattern,

laminating on a second insulation layer without removing the photoresist which remains after the etching step,

removing the remaining photoresist by a lift-off process,

laminating on a transparent conductive layer as a source electrode and a drain electrode or display electrode,

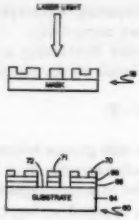
etching said transparent conductive layer and said electrode layer which makes an ohmic contact with said semiconductor layer to separate them into layer portions and to thereby provide said transparent conductive layer as said source electrode and said drain or display electrode.

4,684,436

METHOD OF SIMULTANEOUSLY ETCHING PERSONALITY AND SELECT

Francis C. Burns, Endicott, and Gary R. Carden, Endwell, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Oct. 29, 1986, Ser. No. 924,487
Int. Cl.[4] B44C 1/22; C23F 1/02; C03C 15/00; B29C 37/00
U.S. Cl. 156—643 39 Claims



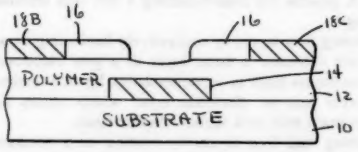
1. A method for performing differential etching of material by using electromagnetic radiation, the steps comprising:
(a) generating a beam of electromagnetic radiation;
(b) providing material to be selectively etched, said material having two predetermined regions; and
(c) selectively varying the energy intensity of predetermined areas within said beam of electromagnetic radiation so that both of said predetermined regions of said material are etched simultaneously and each of said predetermined regions is etched at a rate independent of the etching rate of the other of said predetermined regions.

4,684,437

SELECTIVE METAL ETCHING IN METAL/POLYMER STRUCTURES

John J. Donelon, Mahopac; Yaffa Tomkiewicz, Scarsdale; Thomas A. Wassick, Wappingers Falls, and James T. Yeh, Katonah, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1985, Ser. No. 793,608
Int. Cl.[4] B44C 1/22
U.S. Cl. 156—643 21 Claims



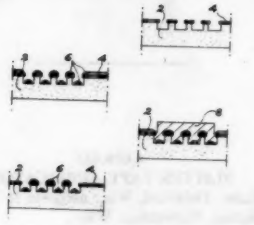
1. A method for removing a metal layer from a structure, in the presence of a polymer layer, without substantial removal of said polymer layer, by the step of
irradiating said metal layer with pulsed ultraviolet radiation of a wavelength in the range 100–400 nm and an energy fluence per pulse sufficiently high that said metal is rapidly removed in one or two pulses while only a thin surface region less than a few microns of said polymer is etched by said ultraviolet radiation pulses said energy fluence per pulse being greater than 3–5 J/cm^2.

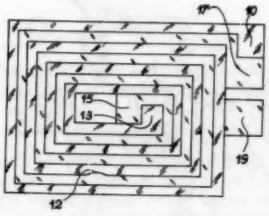
4,684,438

PROCESS FOR PRODUCING A COIL FOR A MAGNETIC RECORDING HEAD

Jean-Pierre Lazzari, Corenc, France, assignor to Commissariat a l'Energie Atomique, Corenc, France

Filed Jan. 30, 1985, Ser. No. 696,485
Claims priority, application France, Feb. 3, 1984, 84 01878
Int. Cl.[4] G11B 5/17
U.S. Cl. 156—649 4 Claims





1. A process for producing a coil for a magnetic recording head, consisting of the steps of:
covering an insulating support with a thin insulating film, said film being selected from the group consisting of silica and silicon nitride; and etching the insulating film by photolithography in order to give said film the shape of a first spiral having a center and periphery, which said first spiral terminates at the center as a wider area defining a future inner contact area, and terminates on the periphery as an area defining a future outer contact element; and etching the support by using the spiral-shaped insulating film as a mask to form a groove in the shape of a second spiral, which said second spiral is interleaved and couplementary to the first spiral, said groove having a groove bottom and a depth; and depositing a thin metal layer simultaneously on the insulating film used as the mask and on the bottom of the etched groove, which gives rise to a first conductor on the insulating film and a second conductor on the groove bottom, which said first and second conductors are in the form of complementary spirals to each other, and are located in two different horizontal planes, each of said spirals terminating by an inner contact element and an outer contact element, the thin metal layer having a thickness of approximately $\frac{1}{4}$ of the depth of the groove; and
depositing a photosensitive resin completely over at least said spirals; and
removing the resin outside said spirals; and removing, by etching, portions of the metal layer deposited on the insulating film outside said spirals; and
removing the remaining resin; and
making an electrical connection between the inner contact element of the first or second spiral and the outer contact element of the other first or second spiral.

4,684,439

CREPING ADHESIVES CONTAINING POLYVINYL ALCOHOL AND THERMOPLASTIC POLYAMIDE RESINS DERIVED FROM POLY(OXYETHYLENE) DIAMINE

Dave A. Soerens, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Oct. 10, 1986, Ser. No. 917,640
Int. Cl.[4] D21H 5/24
U.S. Cl. 162—111 7 Claims

1. A method of creping cellulosic webs comprising: (a) applying to a rotating creping cylinder an aqueous admixture containing from about 90 to about 99.95 weight percent water and from about 0.05 to about 10 weight percent solids, wherein from about 20 to about 90 weight percent of said solids is water-soluble polyvinyl alcohol and wherein from about 10 to about 80 weight percent of said solids is a water-soluble, thermoplastic polyamide resin which is phase-compatible with the polyvinyl alcohol, said polyamide resin comprising the reaction product of a polyalkylene polyamine, a saturated aliphatic dibasic carboxylic acid, and a poly(oxyethylene) diamine; (b) pressing a cellulosic web against the creping cylinder to effect adhesion of the web to the surface of the cylinder; and (c) dislodging the web from the creping cylinder by contact with a doctor blade.

4,684,440

METHOD FOR MANUFACTURING PAPER PRODUCTS

John G. Penniman, Carmel, and Maria S. Reichlin, White Plains, both of N.Y., assignors to Paper Chemistry Laboratory, Inc., Carmel, N.Y.

Filed Dec. 9, 1985, Ser. No. 806,884
Int. Cl.[4] D21D 3/00; D21F 11/00
U.S. Cl. 162—184 23 Claims

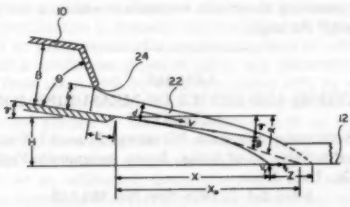
1. A method for increasing the rate of water removal from a web of a paper product during consolidation, pressing and drying which comprises: applying at least one non-polar organic solvent to the web after formation but before the web is dried in a drying stage, which solvent is applied in an amount sufficient to at least partially displace water from between the fibers of the web; and at least partially displacing water from the web by a pressing stage.

4,684,441

METHOD FOR OPERABLY ADJUSTING A LEADING, FORMING BOARD STRIP

Ahmed A. Ibrahim, Westerville, Ohio, assignor to Papyrus Inc., Westerville, Ohio

Filed Jul. 9, 1986, Ser. No. 883,729
Int. Cl.[4] D21F 1/54, 7/00
U.S. Cl. 162—198 3 Claims



1. A method for operably adjusting the forming board of a paper making apparatus of the type having a headbox for impinging a jet of papermaking slurry from its slice onto the upper surface of a wire moving longitudinally over and supported by a forming board which includes a leading, forming board strip, said method comprising:

(a) detecting the position and length of the intercept of the jet with the wire during dynamic operation of the papermaking apparatus;

(b) positioning the leading strip of the forming board at said intercept; and

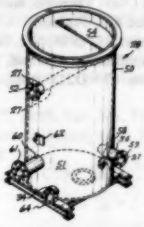
(c) adjusting the length of said leading strip of the forming board in the direction of travel of the wire to substantially 90%–95% of the length of said intercept, wherein the intercept extends forwardly of a leading edge of the leading strip.

4,684,442

OXYGEN REACTOR DEAERATION TANK AND SYSTEM

Michael D. Meredith, Tacoma; Joseph M. Bentvelzen, Sumner, and Marvin F. Jordan, Longview, all of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Continuation-in-part of Ser. No. 594,455, Mar. 29, 1984, abandoned. This application Apr. 1, 1985, Ser. No. 718,188
Int. Cl.[4] D21C 9/10, 11/06; B01D 19/00
U.S. Cl. 162—242 8 Claims



1. A system for deaerating oxygen from pulp comprising
means for reacting oxygen with pulp,
an outlet from said reacting means,
a deaeration tank,
said deaeration tank having a height in the range of 1 to 3"D",
said deaeration tank having a first inlet pipe at the upper part of said deaeration tank,
said fist inlet pipe extending across said tank along a diameter of said tank and extending into said tank a distance greater that 0.5"D",
said first inlet pipe being located from the top of said tank a distance in the range of 10–50% of the height of said tank
an outlet at the bottom of said deaeration tank and
a second swirl inducing inlet pipe in the lower part of said deaeration tank,
said second inlet pipe being located between a tangent to the tank and a radial line of the tank 90° C. from said tangent,
said second inlet pipe being located above the bottom of the tank a distance in the range of 15–25% of the height of the tank,
said second inlet pipe decreasing in diameter from an end of the pipe outside the tank to an end of the pipe inside the tank,
means connecting the outlet of said reacting means to said first inlet pipe of said deaeration tank,
a washer for separating a pulp slurry into a pulp and a filtrate,
means connecting said deaeration tank outlet to the inlet of said washer,
means for recycling filtrate from said washer,
means connecting said filtrate recycle means with said second inlet pipe of said deaeration tank.

4. A deaerator comprising
a tank, said tank being closed at its base and having a diameter "D",
said tank having a height in the range 1 to 3"D",
a first inlet pipe on said tank, said first inlet pipe extending across said tank along a diameter and extending into said tank greater than 0.5"D",
a splash plate located on a wall of the tank opposite said first inlet pipe,

said first inlet pipe being located in the range of 10–50% of the height of said tank from the top of the tank and having diameter of 0.07–0.161 "D",

an outlet to said tank at the base of said tank,

a seconId inlet pipe on the side of the tank,

said second inlet pipe extending in a direction that is between a tangent to the tank and a radial line of the tank 90° from said tangent,

said second inlet pipe being located ia the range of 15–25% of the height of the tank above the bottom of the tank,

said tank outlet, said outlet of said first inlet pipe and said outlet of said second inlet pipe being in the same vertical plane.

4,684,443

APPARATUS FOR GUIDING A WEB LEADER IN A PAPER MACHINE

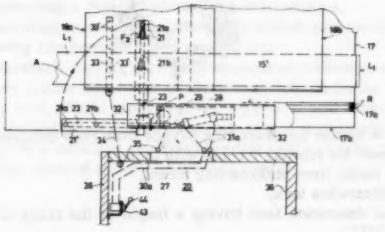
Reima Kerttula, and Olavi Viitanen, both of Jyväskylä , Finland, assignors to Valmet Oy, Finland

Filed Apr. 26, 1985, Ser. No. 727,444

Claims priority, application Finland, May 4, 1984, 841801

Int. Cl.[4] D21F *1/42, 7/04*

U.S. Cl. 162—255 **17 Claims**



1. Apparatus for guiding a leader of a web between a press section of a paper machine and an initial part of a drying section of a papaer machine, the drying section including a plurality of drying cylinders and a drying wire loop, said apparatus comprising:

at least one elongate flexible threading member forming a gap into which the leader is shifted,

initial air blow means for guiding the leader toward the drying wire of the drying section so that the leader becomes attached to an edge region of said drying wire,

detaching means including a first blow member situated within the loop of the drying wire proximate to an edge thereof for at least partially detaching the leader from said edge region of said drying wire,

second air blow means situated at least slightly forwardly of said detaching means in the direction of web run proximate to an edge of the drying wire for applying transversely directed air jets onto the detached leader, said second air blow means including a second blow member comprising an elongate, substantially plate shaped member mounted on mounting means for movement betweeen a non-operating lateral position and an operating position extending completely across said edge region of said drying wire and said detached web leader in opposed overlying relationship to the leader and said edge region of the drying wire, said second blow member having nozzle means formed therein for applying the transversely directed air jets onto the detached leader when the second blow member is in the operating position so as to shift the detached leader into the gap formed by the at least one elongate flexible threading nember, said nozzle means including nozzle openings at least one of which is situated directly over said edge region of said drying wire and said detached web leader.

4,684,444

SORTER FOR PAPER PULP SUSPENSIONS INCLUDING A DAMPING CHAMBER

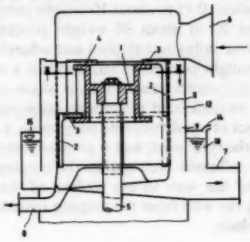
Albrecht Meinecke, Heidenheim; Hans-Rainer Schmid, Nattheim, and Dieter Egelhof, Heidenheim, all of Fed. Rep. of Germany, assignors to J.M. Voith GmbH, Fed. Rep. of Germany

Filed Jan. 21, 1986, Ser. No. 821,075

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1985, 3503241

Int. Cl.[4] D21D *5/02, 5/22;* B07B *1/20*

U.S. Cl. 162—380 **11 Claims**



1. A sorter for paper pulp suspension, comprising:

a screen comprising a stationary, rotationally symmetrical wire cage having an internal periphery, the pulp suspension being moved through the wire cage from the internal periphery outwardly; the cage having an inlet through which suspension is fed into the cage;

a plurality of vanes disposed at the internal periphery of the cage, and a rotor for rotating the vanes to move past the internal periphery of the cage and to move the suspension through the wire screen;

an annular pulp chamber surrounding the cage for receiving pulp that has moved through the cage; a pulp outlet being provided for conducting pulp from the pulp chamber;

a damping chamber separate from the pulp chamber and disposed between the pulp outlet from the pulp chamber and the pulp chamber, such that pulp passes from the pulp chamber past the damping chamber to the pulp outlet, and the damping chamber being so placed that the suspension from the pulp chamber rises in the damping chamber to form a pool therein;

means defining a cushion providing gas pressure in the damping chamber for gas pressurizing the suspension in the damping chamber, thereby for damping the motion of the suspension from the pulp chamber to the pulp outlet; and

a second outlet communicating with the interior of the cage for removing therefrom suspension which is not passed through the cage.

4,684,445

METHOD AND DEVICE OF MEASURING ION ACTIVITY

Osamu Seshimoto; Mituharu Nirasawa; Masaaki Terashima, and Yoshio Saito, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Jul. 3, 1986, Ser. No. 881,815

Claims priority, application Japan, Jul. 5, 1985, 60-148564

Int. Cl.[4] G01N *27/30*

U.S. Cl. 204—1 T **9 Claims**

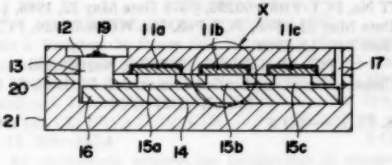
1. A method of measuring ion activity of a liquid sample comprising steps of spotting a reference liquid and the liquid sample on surfaces of ion-selective membranes, respectively, of at least a pair of ion-selective electrode sheets which are electrically insulated from each other, said ion-selective membranes being arranged on the top of said ion-selective electrode sheets; and measuring a potential difference between said both

ion-selective electrodes under the condition that said both liquids are electrically connected to each other by a bridge, which is characterized in that:

said each ion-selective electrode sheet is arranged upside down in such a manner that the ion-selective membrane is positioned on the lowest side; and

said each liquid spotted from the upper side is temporarily conveyed downwardly to the lower level than the surface of the ion-selective membrane, and then conveyed upwardly to the surface of the ion-selective membrane so as to reach the surface of the ion-selective membrane.

5. A device for measuring ion activity in a liquid sample comprising at least a pair of ion-selective electrode sheets having ion-selective membranes on the top portion, liquid-



guiding portions for guiding a reference liquid and a liquid sample to each surface of said ion-selective membranes, respectively, and a bridge for electrically connecting both liquids to each other, which is characterized in that:

said each ion-selective electrode sheet is arranged upside down in such a manner that the ion-selective membrane is positioned on the lowest side; and

said each liquid-guiding portion comprises a liquid receiving opening, a downward passage for conveying the liquid to the lower level than the surface of the ion-selective membrane, a horizontal passage for conveying the liquid in the horizontal direction to the position just below the surface of the ion-selective membrane, and an upward passage for conveying said liquid to the surface of the ion-selective membrane.

4,684,446

SECONDARY METALLIZATION BY GLASS DISPLACEMENT IN CERAMIC SUBSTRATE

Richard J. Charles, Schenectady; Stephan P. Mitoff, Clifton Park, and Wayne D. Pasco, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 26, 1985, Ser. No. 780,137

Int. Cl.⁴ H05K *3/10*

U.S. Cl. 204—15 **18 Claims**

1. A process for increasing the electrical conductance of a metallization on a ceramic substrate which comprises providing a ceramic substrate with an adherent electrically conductive refractory metal metallization wherein at least one portion of said metallization is exposed, said metallization being comprised of an intermixture of a continuous phase of refractory metal and a continuous phase of glass, said refractory metal ranging from about 25% by volume to about 65% by volume of said metallization, contacting said refractory metal at at least one exposed portion of said metallization with an intrusion metal selected from the group consisting of copper, nickel, tin, gold, iron, cobalt, and alloys thereof, heating the resulting structure to an infiltration temperature which is above the transition temperature of said glass and at which said intrusion metal is liquid but said refractory metal is solid thereby infiltrating said liquid intrusion metal into said metallization, at said infiltration temperature said liquid metal preferentially wetting said refractory metal displacing said glass with said intrusion metal, and allowing the resulting structure to cool thereby solidifying said infiltrated liquid intrusion metal in place, said solid infiltrated intrusion metal at least partly occupying the volume space originally occupied by said displaced glass and being in contact with said refractory metal phase, said process being carried out in an atmosphere which has no significant deleterious effect on said ceramic substrate, said refractory metal metallization and said intrusion metal.

4,684,447

METHOD FOR APPLYING PROTECTIVE COATINGS

Jagannathan Murali, Houston, Tex., and Erwin Buck, Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Mar. 24, 1986, Ser. No. 842,965

Int. Cl.⁴ C23C *28/00*

U.S. Cl. 204—38.5 **6 Claims**

1. In a method for applying a flame sprayed aluminum coating to a steel substrate, the improvement which comprises applying an electroplated aluminum layer to said substrate prior to the application of said flame sprayed aluminum coating.

4,684,448

PROCESS OF PRODUCING NEODYMIUM-IRON ALLOY

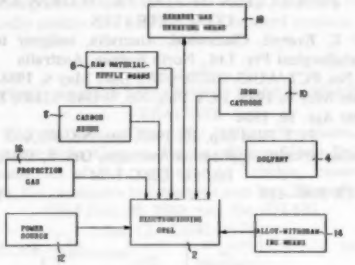
Katsuhisa Itoh; Yoshiaki Watanabe, both of Nagoya; Eiji Nakamura, Chita, and Masayasu Toyoshima, Nagoya, all of Japan, assignors to Sumitomo Light Metal Industries, Ltd., Japan

Filed Sep. 17, 1985, Ser. No. 776,800

Claims priority, application Japan, Oct. 3, 1984, 59-207733; Nov. 22, 1984, 59-247546

Int. Cl.⁴ C25C *3/36*

U.S. Cl. 204—71 **5 Claims**



1. A process for producing a neodymium-iron alloy comprising:

preparing a bath of molten electrolyte which has a composition consisting essentially of 35-76% by weight of neodymium fluoride, 20–60% by weight of lithium fluoride, up to 40% by weight of barium fluoride and up to 20% by weight of calcium fluoride, said molten bath being exposed to at least one iron cathode and at least one carbon anode, said bath being held at a temperature of 770°–950° C.;

effecting electrolytic reduction of said neodymium fluoride in said bath of molten electrolyte by applying a first direct current to said at least one carbon anode, said first direct current having a current density of 0.05–0.60 A/cm^2, and applying a second direct current to said at least one iron cathode, said second direct current having a current density of 0.5–55 A/cm^2, so as to electrodeposit neodymium on said at least one iron cathode and alloying the electrodeposited neodymium with iron from said at least one iron cathode, thereby producing a liquid neodymium-iron alloy on said at least one iron cathode;

continuously adding neodymium fluoride to said bath of molten electrolyte so as to maintain the composition of the bath, thereby compensating for consumption of the neodymium fluoride during production of said liquid neodymium-iron alloy

dripping the liquid neodymium-iron alloy from said at least one iron cathode into a receiver having a mouth which is opened upward relative to said bath, said receiver being

located in a lower portion of the bath of electrolyte below said at least one iron cathode, thereby collecting said liquid neodymium-iron alloy in the form of a molten pool in said receiver; and

withdrawing said molten pool of the liquid neodymium-iron alloy from said receiver.

4,684,449

PROCESS FOR PRODUCING M-HYDROXYBENZYL ALCOHOL

Shinji Takenaka; Ryu Oi, and Chitoshi Shimakawa, all of Ohmuta, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Nov. 19, 1986, Ser. No. 932,333

Claims priority, application Japan, Nov. 26, 1985, 60-263858; Dec. 5, 1985, 60-272467

Int. Cl.[4] C07B *29/06*; C07C *29/00*

U.S. Cl. 204—75 **5 Claims**

1. A process for producing m-hydroxybenzyl alcohol which comprises electrolytically reducing m-hydroxybenzoic acid in an acidic aqueous solution, wherein m-hydroxybenzyl alcohol is caused to be always present in the electrolytic solution by continuously adding to the electrolytic solution m-hydroxybenzoic acid in an amount corresponding to that consumed as the electrolytic reaction proceeds, and the electrolysis is carried out at a temperature of 20° to 70° C.

4,684,450

PRODUCTION OF ZINC FROM ORES AND CONCENTRATES

Peter K. Everett, Chatswood, Australia, assignor to Dextec Metallurgical Pty. Ltd., North Sydney, Australia

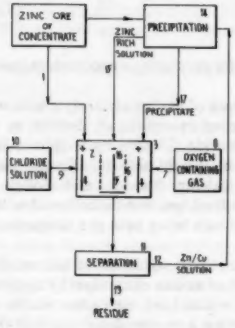
PCT No. PCT/AU85/00230, § 371 Date May 6, 1986, § 102(e) Date May 6, 1986, PCT Pub. No. WO86/02107, PCT Pub. Date Apr. 10, 1986

PCT Filed Sep. 20, 1985, Ser. No. 871,402

Claims priority, application Australia, Oct. 5, 1984, PG7516

Int. Cl.[4] C25C *1/14*

U.S. Cl. 204—118 **11 Claims**



1. A process for recovering zinc from a zinc bearing ore or concentrate in an electrolytic cell, the cell including a cathode compartment containing a cathode, and an anode compartment containing an anode, the cathode and anode compartments defined by interposing an ion selective membrane therebetween, the membrane being capable of preventing migration of heavy metal ions which may interfere with the plating of zinc from the anode compartment to the cathode compartment, the process including forming in the anode compartment a slurry of the ore or concentrate with a solution containing chloride ions and copper ions, intimately mixing oxygen bearing gas with the slurry, maintaining the mixture substantially at atmospheric pressure and at a temperature up to the boiling point of the solution, and maintaining the pH of the mixture from 1 to 4 applying electrolysis current to the cell whereby the resultant solution is rich in solubilized zinc, withdrawing at least a portion of the mixture and separating the resultant solution therefrom, contacting the resultant solution with zinc bearing ore or concentrate whereby copper is precipitated therefrom, introducing the resultant solution to the cathode compartment and electrochemically recovering zinc at the cathode.

4,684,451

PROCESS AND DEVICE FOR BRINGING A STRIP TRAVELING IN A LIQUID INTO CONTACT WITH A DIVERTING ROLL

Pierre M. Damiron, and Jean-Luc Legoupil, both of Paris, France, assignors to Clecim, Courbevoie, France

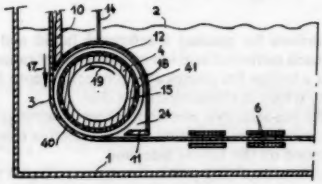
PCT No. PCT/FR85/00206, § 371 Date May 22, 1986, § 102(e) Date May 22, 1986, PCT Pub. No. WO86/00939, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 25, 1985, Ser. No. 858,190

Claims priority, application France, Jul. 26, 1984, 84 11860

Int. Cl.[4] C25F *1/00*

U.S. Cl. 204—141.5 **5 Claims**



1. Process for bringing into contact with a diverting roll a strip traveling at a high speed in a liquid (2) held in a tank (1) equipped with at least one roll for diverting (4) the strip (3), the latter being subjected to a traction and partially enclosing the surface of the roll, a part of the liquid being entrained into the contact zone (40) between the strip (3) and the roll (4), characterized in that a certain quantity of gas which is insoluble in the liquid and capable of mixing with the entrained part of the liquid is introduced in the vicinity of the surface of the roll (4) and at least upstream of the contact zone (40) in the direction of travel, to form a compressible fluid between the strip (3) and the roll (4).

4,684,452

PROCESS FOR THE FLUORINATION IN LIQUID PHASE OF UNSATURATED COMPOUNDS

Giuseppe Marchionni, Milan; Claudio Tonelli, Concorezzo/-Milano, and Alberto Nicoletti, Milan, all of Italy, assignors to Ausimont S.p.A., Milan, Italy

Filed Apr. 3, 1986, Ser. No. 847,448

Claims priority, application Italy, Apr. 4, 1985, 20236 A/85

Int. Cl.[4] B01J *19/12*

U.S. Cl. 204—157.94 **4 Claims**

1. Process for the fluorination with elemental fluorine of perfluorinated olefins containing from 4 to 12 carbon atoms, linear, cyclic or branched, with the condition that the branching is not on adjacent atoms, or of perfluoro-vinyl ethers having the general formula

$$R_f\text{—}O\left(\begin{array}{l}CF\text{—}CF_2O\\ |\\ CF_3\end{array}\right)_z\text{—}CF{=}CF_2$$

wherein R_f is a perfluorinated radical of from 1 to 3 carbon atoms, and z is an integer ranging from 0 to 2, and when $R_f{=}CF_3$, z is at least equal to 1, with chains containing from 4 to 12 carbon atoms, wherein one or more carbon atoms can be

replaced by oxygen atoms, the fluorination being carried out in liquid phase comprising as the reaction solvent a low-volatility perfluoroether, having molecular weight not lower than 450, the reaction being carried out at a temperature comprised within the range of from −25° C. to +120° C., in the presence of activating radiations comprised within the visible spectrum on in U.V. range, having wavelength comprised within 2200 Å and 8000 Å, and with the use of gaseous mixtures of fluorine and inert gas, containing from 10% to 80% by volume of fluorine.

4,684,453

PURIFICATION OF DYE BATHS

Daniel J. Vaughan, 36 Paxon Dr., Wilmington, Del. 19803

Continuation-in-part of Ser. No. 665,052, Oct. 26, 1984, which is a continuation-in-part of Ser. No. 568,897, Jan. 6, 1984, abandoned. This application Jan. 21, 1986, Ser. No. 819,931

Int. Cl.[4] B01D *57/02;* **C23C** *22/86;* **C09B** *67/54*

U.S. Cl. 204—182.4 **6 Claims**

1. An electrolytic process for purification of oxygen- or hydrogen-sensitive organic dyes which comprises applying an electrical potential to an aqueous acidic solution of said organic dye containing metal cations in an intermediate or feed compartment of an electrochemical cell having an anolyte compartment with an anode and an aqueous anolyte and a catholyte compartment with a cathode and an aqueous catholyte, said compartments being separated by cation permeable membranes, whereby said dye is separated from the anode and oxygen formed at the anode and the cathode and hydrogen formed at the cathode and metal cations are electrotransported from said feed compartment through said membrane into said catholyte compartment.

4,684,454

SPUTTERING PROCESS FOR MAKING MAGNETO OPTIC ALLOY

Richard N. Gardner, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 742,477, Jun. 7, 1985, abandoned, which is a division of Ser. No. 495,175, May 17, 1983, abandoned. This application May 8, 1986, Ser. No. 861,081

Int. Cl.[4] C23C *14/42*

U.S. Cl. 204—192.2 **6 Claims**

1. A process for making an amorphous magneto optic thin film recording medium consisting essentially of sputtering the film constituents, which comprise at least one rare earth element selected from the group consisting of gadolinium, terbium, and dysprosium, and at least one transition metal selected from the group consisting of cobalt, iron and chromium, onto a substrate, utilizing a triode sputtering apparatus at a pressure of less than 4×10^{-3}Torr, and continuing the sputtering until an amorphous magneto optic thin film having a thickness of up to 2000 Angstroms has been deposited.

4,684,455

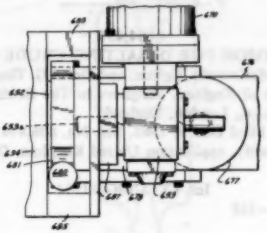
ELECTRICAL CONTINUITY CLAMP FOR ECM MACHINE

Edmund R. Hinman, Monroe, Conn., assignor to Ex-Cell-O Corporation, Troy, Mich.

Filed Nov. 27, 1985, Ser. No. 802,404

Int. Cl.[4] B23H *3/00;* **H01R** *39/00*

U.S. Cl. 204—212 **6 Claims**



1. In an electrochemical machine tool, the combination of an indexable shaft means on which a workpart is carried in electrically conductive relation to the shaft means, means for indexing the shaft means, resilient electrical coupling clamp means around the shaft means, means for supplying electrical current to the coupling clamp means and means for causing the coupling clamp means to contact and clamp the shaft means in electrically conductive relation in an indexed position.

4,684,456

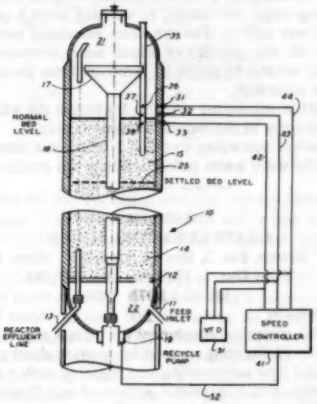
CONTROL OF BED EXPANSION IN EXPANDED BED REACTOR

Roger P. Van Driesen, Titusville; William R. Adams, Upper Montclair; John Caspers, Basking Ridge; Mario Baldasarri, Paramus, all of N.J., and Harold Trimble, Panama City Beach, Fla., assignors to Lummus Crest Inc., Bloomfield, N.J.

Filed Dec. 20, 1985, Ser. No. 811,651

Int. Cl.[4] C10G *13/02*

U.S. Cl. 208—143 **14 Claims**



1. In a hydrogenation process wherein a fluid is recycled from an upper portion of a reactor to a portion of the reactor below an expanded bed of catalyst by a recycle pump, the improvement comprising:

automatically controlling the expansion of the expanded bed of catalyst by automatically increasing the rate of speed of

the recycle pump when the expanded bed is below a first level in the reactor until the bed reaches the first level; thereafter automatically maintaining a substantially constant speed for the pump until the expanded bed of catalyst reaches a second level in the reactor which is higher than the first level; automatically decreasing the rate of speed of the recycle pump until the expanded bed falls below the second level; and thereafter maintaining a substantially constant rate of speed of the recycle pump until the expanded bed falls below the first level.

4,684,457

METHOD FOR DESALTING CRUDE OIL

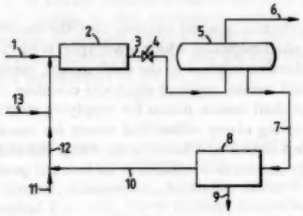
Malcolm T. McKechnie, Egham, and David G. Thompson, Richmond, both of England, assignors to The British Petroleum Company p.l.c., London, England

Filed Dec. 9, 1985, Ser. No. 806,474

Claims priority, application United Kingdom, Dec. 20, 1984, 8432278

Int. Cl.[4] C10G *33/04*

U.S. Cl. 208—188 **6 Claims**



1. A method for reducing the salt content of crude oil which method comprises washing crude oil containing salt water with at least 1% by volume of wash water of lower salinity than the water present in the crude oil, expressed as a percentage by volume of the crude oil, separating the resulting mixture of oil and water into a layer of crude oil of reduced salt content and a layer of saline water, passing the saline water through a cross-flow membrane separator having a membrane surface, removing the permeate from the separator as effluent, recycling the retentate via a recycle stream from the separator to the washing stage, and adding to washing stage a quantity of water of lower salinity than the water associated initially with the crude oil, the quantity of added water corresponding at least to the volume of permeate removed from the cross-flow membrane separator.

2. A method according to claim 1 wherein the added water is added directly to the recycle stream.

4. A method according to claim 1 wherein a demulsifier is added to the wash water before washing the crude oil.

4,684,458

GRAIN CLEANING AUGER

La Von P. Grotto, Rte. 3, Box 62, Litchfield, Minn. 55355

Filed Dec. 5, 1985, Ser. No. 805,283

Int. Cl.[4] B07B *9/00*

U.S. Cl. 209—31 **13 Claims**

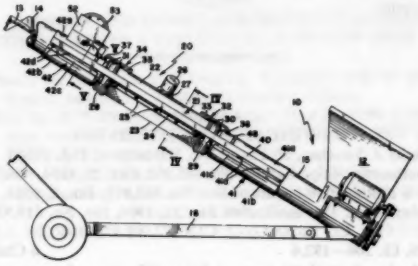
1. A grain cleansing attachment for a grain auger having an auger shaft with flighting secured for rotation about a shaft axis and an auger tube surrounding said flighting with a portion of said tube removed to expose a portion of said flighting;

means for rotating said auger shaft;

means for positioning said auger to draw grain from a source at an upstream end of said tube by rotating said auger shaft and flighting and transporting said grain through said tube and discharging said grain from a downstream end of said tube;

said cleaning attachment comprising a housing sized to surround said portion of said flighting, said housing having an inner surface opposing and spaced from said portion of said flighting, said inner surface being spaced apart from said portion of said flighting by a predetermined distance, said distance being sized to accommodate a vibratory stroke of said housing toward and away from said flighting without said housing interferring with operation of said flighting;

flexible means for fastening said housing to said tube with



said housing free to vibrate relative to said tube; stop means acting on said auger tube for preventing an upper surface of said inner surface from contacting an upper portion of said portion of said flighting;

said housing having a sieve; and vibration means for vibrating said housing whereby grain transported through said auger is vibrated on top of said sieve with impurities mixed with said grain passing through said sieve thereby cleansing said grain as said grain moves through said housing.

4,684,459

COLLECTOR COMPOSITIONS FOR THE FROTH FLOTATION OF MINERAL VALUES

Richard R. Klimpel, and Robert D. Hansen, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 803,026, Nov. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 787,199, Oct. 15, 1985, abandoned, which is a continuation-in-part of Ser. No. 649,890, Sep. 13, 1984, abandoned. This application Apr. 28, 1986, Ser. No. 856,728

Int. Cl.[4] B03D *1/02*

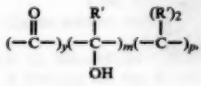
U.S. Cl. 209—166 **23 Claims**

1. A composition comprising

(a) a compound corresponding to the formula:

$$R^1—X—(R)_nN(R^2)_a(H)_b$$

where $—(R)_n$ is



R′ is hydrogen, methyl or ethyl, y+p+m=n, n is an integer from 1 to 6 and each moiety can occur in random sequence; R^1 and R^2 are independently a $C_{1\text{-}22}$ hydrocarbyl or a $C_{1\text{-}22}$ substituted hydrocarbyl; X is —S— or

a is 0 or 1, b is 1 or 2 and $a+b=2$; and

(b) a thiol compound selected from the group consisting of thiocarbonate, thionocarbamate, thiocarbanilide, thio-

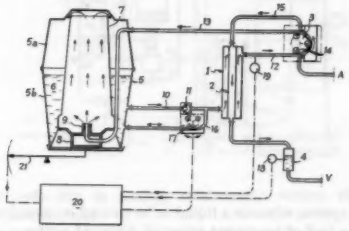
phosphate, thiophosphinate, mercaptan, xanthogen formate, a xanthic ester and mixtures thereof.

4,684,460

HAEMODIALYSIS DEVICE AUTOMATICALLY MONITORING LOSS OF WEIGHT

Gérald Issautier, Domaine des Alpilles - Immeuble le Saint Rémy 397, Corniche Kennedy, 13007 - Marseille, France

Filed Dec. 5, 1985, Ser. No. 805,436
Claims priority, application France, Dec. 14, 1984, 84 19314
Int. Cl.[4] A61M *1/34*
U.S. Cl. 210—90 **5 Claims**



1. A haemodialysis device which comprises a dialyzer, a dialysis membrane within the dialyzer, a reservoir containing the dialysis liquid, a cartridge for regenerating the dialysis liquid located within the reservoir, means for circulating a patient's blood through said dialyzer and for circulating the dialysis liquid in closed circuit between said reservoir, said dialyzer and said regeneration cartridge, and means for automatically varying the pressure of the dialysis liquid in the dialyzer in order to vary the difference in pressure between the blood of said patient and the dialysis liquid and to control the loss of weight per unit of time, wherein the blood and dialysis liquid are circulated by a single positive displacement pump.

4,684,461

APPARATUS FOR THE TREATMENT, IN PARTICULAR SOFTENING AND/OR COMPLETE DESALINATION OF WATER

Erich Alhäuser, Am Hölzeberg 2, Ransbach-Baumbach, Fed. Rep. of Germany

Filed Jan. 30, 1986, Ser. No. 824,092
Claims priority, application Fed. Rep. of Germany, Feb. 5, 1985, 3503768
Int. Cl.[4] C02F *1/42*
U.S. Cl. 210—96.1 **12 Claims**

1. An apparatus for the treatment of flow through water comprising:

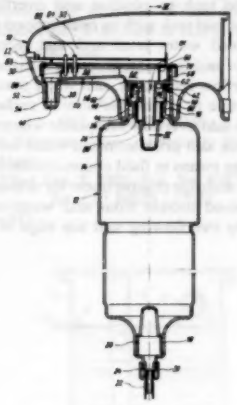
a wall bracket,

a cartridge containing a treatment material for treating the water, and through which the water flows,

means for mounting the cartridge on the wall bracket with the cartridge in an upright position,

said cartridge having a bottom connection aperture for supplying water to the cartridge and a top connection aperture for delivering the water out of the cartridge, an open ended drainage line located within the wall bracket, in open communication with said top connection aperture at one end thereof, and having a drainage outlet spout at the other end thereof, and

a fixing and sealing assembly means for connecting said top connecting aperture of the cartriage to the wall bracket with the cartridge suspended downwardly therefrom, and with said top connection aperture in fluid tight engagement with said wall bracket so as to provide a continuous drainage channel from said cartridge through said top



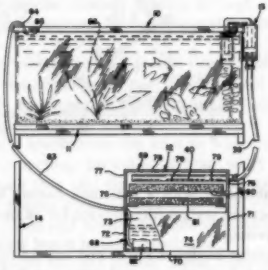
connection aperture, through said open drainage line and to said outlet spout.

4,684,462

FILTRATION, AERATION, AND WATER LEVEL CONTROL MEANS FOR AQUARIUMS

George E. Augustyniak, 4928 31st Pl., Cicero, Ill. 60650

Filed Jun. 16, 1986, Ser. No. 874,438
Int. Cl.[4] A01K *63/00*
U.S. Cl. 210—97 **22 Claims**



1. Apparatus for incorporation into the recirculation water purifying system of an aquarium provided with a tank containing a body of water, the combination including said tank comprising:

means operable to continuously supply said tank with water;

water level control means for maintaining a predetermined level of water in said tank including an open-topped, overflow receptacle having water passageway means provided therein adjacent its open-topped end, a second open-topped receptacle having a partition wall extending vertically from the bottom thereof to divide the interior of said receptacle into a water-receiving compartment and a drainage compartment, the top edge of said partition wall lying generally in a horizontal plane vertically spaced intermediate the bottom and the open-topped end of said second receptacle, said water level control means including siphon tube means for transferring water from said overflow receptacle to said water-receiving compartment, the intake and discharge openings being vertically spaced

below said horizontal plane containing said top edge of said partition wall;

mounting means for attaching said water control means to a wall of said tank to position said overflow receptacle interiorly of said tank with its open-topped end above said predetermined water level and said second receptacle exteriorly of said tank and generally horizontally adjacent to said overflow receptacle, said water passageway means being effective to permit the flow of surface water from said tank to said overflow receptacle whenever said water level exceeds said predetermined water level; and

water drainage means in fluid communication with the interior of said drainage compartment for draining the same of water received therein from said water-receiving compartment by overflowing said top edge of said partition wall.

4,684,463

FILTER DEVICE FOR IN-TANK TYPE FUEL PUMP FOR VEHICLE

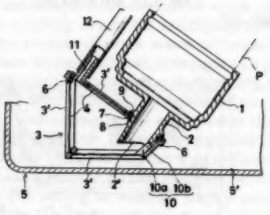
Akira Mizusawa, Utsunomiya, Japan, assignor to Nifco, Inc., Yokohama, Japan

Filed Feb. 25, 1986, Ser. No. 833,363

Claims priority, application Japan, Feb. 27, 1985, 60-26327[U]

Int. Cl.[3] B01D *35/02*

U.S. Cl. 210—172 **3 Claims**



1. In combination with a fuel tank having a substantially horizontal bottom wall, a filter device for an in-tank type fuel pump, comprising:

a pump holder having a lower end and an open upper end and adapted to receive and retain an in-tank type fuel pump at said upper end and having a longitudinal axis forming an acute angle with said fuel tank bottom wall;

a filter housing connected to the lower end of said pump holder, said filter housing being substantially triangular in vertical section and having a bottom wall close to and substantially parallel to said fuel tank bottom wall and further having a top wall substantially perpendicular to said axis and a remote end wall connecting said filter housing top wall and said filter housing bottom wall, each of said filter housing walls having a window therein respectively closed by a filter element; and

a suction pipe provided between the bottom end of said pump holder and said filter housing, said suction pipe being parallel to said axis and extending into said filter housing through said top wall thereof, said suction pipe having a lower open intake end within said filter housing and adjacent said filter housing bottom wall, said lower open intake end being substantially planar and being substantially parallel to said filter housing bottom wall and oblique to said axis.

4,684,464

APPARATUS FOR WASHING MATERIAL

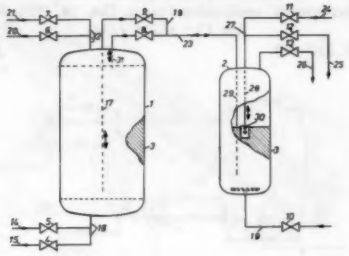
Kurt Marquardt, Holzgerlingen, Fed. Rep. of Germany, assignor to Hager & Elsasser GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 20, 1985, Ser. No. 811,508

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1984, 3447416

Int. Cl.[4] B01J *49/00*

U.S. Cl. 210—189 **18 Claims**



1. In a system wherein a liquid to be treated is caused to flow through a bed of treatment material disposed within a vessel, material comprising the bed being periodically withdrawn from the treatment vessel and subsequently returned thereto, an improved material transfer apparatus comprising:

a container for receiving treatment material withdrawn from the treatment vessel;

first conduit means for selectively establishing a material flow path between the vessel and said container;

means for establishing a flow of transport liquid for entraining treatment material and conveying the entrained material through said conduit means from the vessel to said container;

means for exhausting transport liquid from said container, said transport liquid exhausting means including at least a first liquid drain tube extending into said container, said drain tube having at least a first inlet which is permeable to the transport liquid and impermeable to the treatment material, said inlet to said drain tube being disposed intermediate the top and bottom of said container at a position such that the volume of the container including and below said inlet defines the quantity of material to be withdrawn from the vessel, whereby when the entrained material conveyed from said vessel to said container accumulates in said container to said volume, the conveyance of material from the vessel to the container is automatically terminated;

second conduit means for selectively establishing a flow path for treatment material entrained in a transport liquid from said container to the vessel; and

means for delivering transport liquid to said container for entraining treatment material therein and causing the flow of said entrained treatment material back to the vessel.

4,684,465

SUPERCRITICAL FLUID CHROMATOGRAPH WITH PNEUMATICALLY CONTROLLED PUMP

Emory J. Leaseburge, and Thomas J. Thomas, both of Lewisburg, W. Va., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Oct. 10, 1986, Ser. No. 917,466

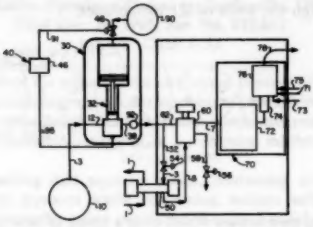
Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—198.2 **1 Claim**

1. An apparatus for analyzing a process stream via supercritical fluid chromatography comprising:

a. chromatograph means for analyzing a sample of the process stream diluted in a volume of the supercritical fluid via supercritical fluid chromatography;

b. pump means for drawing a supercritical fluid substance from a supply means through a supply line, pressurizing said supercritical fluid substance and delivering said pressurized supercritical fluid substance to said chromatograph means, said pump means comprising a pneumatically driven piston type pump having a first large diameter chamber, a second smaller diameter chamber extending axially therefrom, and an axially extending piston rod having a first large diameter head disposed and axially translatable in sealing relationship within the first chamber and a second smaller diameter head disposed and axially



translatable in sealing relationship within the second chamber; and

c. control means for controlling the supply low pressure air to the first chamber of said pump means in a controlled manner so as to draw said supercritical fluid substance from said container means into the second chamber when the pressurized air is vented from the first chamber and to compress said substance drawn into the second chamber to maintain said supercritical fluid substance at a desired pressure above the critical pressure for delivery to said chromatograph means.

4,684,466

FILTER FOR A HIGH PRESSURE SEPARATING PRESS

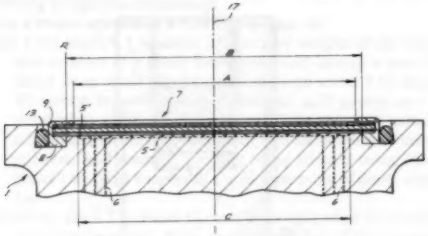
Paulus N. Terpstra, Zaanstad, Netherlands, assignor to Cacaofabriek de Zaan B.V., Koog aan deZaan, Netherlands

Filed Jun. 14, 1985, Ser. No. 744,591

Claims priority, application Netherlands, Jun. 26, 1984, 8402010

Int. Cl.⁴ B01D *25/12*; B30B *15/00*

U.S. Cl. 210—227 **20 Claims**



1. In a filter for use in a high pressure separating press wherein said filter comprises: (i) a press platen having a front-face parallel to the material or object to be filtered, a circular recess in said front-face, and one or more circular grooves provided within said recess in said front-face, and (ii) a filter screen packet comprising one or more layers of flat filtering material positioned on said front-face and attached to said front-face by fastening means, the improvement comprising the positioning of said one or more layers of flat filtering material in a metal ring situated in the circular recess, said metal ring having a peripheral flange, such that a circumferential portion of said one or more layers of flat filtering material is encased between said flange and said metal ring, said flange extending from the ring in a radially inward direction towards the axis of the filter such that the inner diameter of said flange differs from the inner diameter of said ring by about half the difference between the diameter of the outermost circular groove provided in said front-face of said press platen and the inner diameter of said ring.

4,684,467

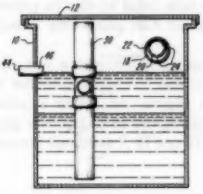
OIL SEPARATOR

John A. Cloud, Kingston, Mass., assignor to Energy Machinery, Rockland, Mass.

Filed Jun. 5, 1986, Ser. No. 870,988

Int. Cl.⁴ B01D *17/025*

U.S. Cl. 210—519 **3 Claims**



1. Apparatus for separating a first liquid from a second liquid of lower specific gravity comprising:

a vessel having inlet means for a mixture of the first and second liquids positioned above the liquid level in said vessel and including diffuser means for preventing turbulence in said vessel caused by air and high velocity liquid flow, said diffuser means comprising as inner pipe having a plurality of holes, and an outer pipe of shorter length than said inner pipe and surrounding said inner pipe for intercepting the mixture passing through said holes and directing the mixture through opposite ends of the outer pipe;

a generally vertical conduit in said vessel, said conduit having an inlet in the lower part of said vessel;

a generally horizontal conduit sealingly coupled between said vertical conduit and a first opening in a wall of said vessel at a level above the inlet to said vertical conduit, said first opening providing a first outlet for said first liquid such that said first liquid reaches said first outlet only by passing through the inlet to said vertical conduit and such that said horizontal conduit establishes the level of said first liquid in said vessel; and

a second outlet for said second liquid comprising a second opening in a wall of said vessel above the level of said first outlet.

4,684,468

PROCESS AND INSTALLATION FOR ANAEROBIC DIGESTION

Luc De Baere, Ghent, Belgium, assignor to Ateliers de Constructions Electriques de Charleroi, Charleroi, Belgium

Continuation of Ser. No. 626,381, Jun. 29, 1984, abandoned. This application Jan. 29, 1986, Ser. No. 823,143

Claims priority, application European Pat. Off., Jul. 1, 1983, 83200980.7

Int. Cl.⁴ C02F *11/04*

U.S. Cl. 210—603 **12 Claims**

1. A process for anaerobic digestion of solid-like organic material, comprising the steps of:

mixing and kneading the solid-like organic material with an inoculant and forming thereby solid-like mass having a water content of from about 55% to about 75% by weight;

feeding the solid-like mass having a water content of from

about 55% to about 75% by weight to an anaerobic digester;

anaerobically digesting said solid-like mass having a water content of from about 55% to about 75% by weight in said digester for a period of less than about 50 days;

recovering biogas produced during said digestion step, said biogas being the byproduct of anaerobic digestion;

extracting the digested mass having a water content of from about 55% to about 75% by weight from said digester;

recycling at least one third by weight of said extracted, digested mass to said mixing step, said recycled mass acting as said inoculant; and

removing the non-recycled digested mass from the process.

4,684,469

TWO COMPONENT BIOCIDAL PROCESS

Daniel E. Pedersen, Cottage Grove, and Herbert J. Hatcher, Eagan, both of Minn., assignors to Ecolab Inc., St. Paul, Minn.

Continuation of Ser. No. 741,716, Jun. 6, 1985, abandoned, which is a continuation of Ser. No. 495,437, May 17, 1983, abandoned. This application Sep. 11, 1986, Ser. No. 906,645

Int. Cl.[4] C02F *1/50*; C12N *9/28*

U.S. Cl. 210—632 **10 Claims**

1. A method to substantially increase the antimicrobial activity of a biocide comprising combining in an industrial water stream a biocide selected from the group consisting of a quaternary ammonium compound, a bromopropionamide, a nitrilopropionamide, a chlorophenate, a benzothiazol, a thiocyanate, a thiocarbamate, and mixtures thereof; and an amount of a polysaccharide-degrading enzyme effective to cooperate with the biocide to substantially increase the antimicrobial activity of the biocide against polysaccharide-producing bacteria, wherein the biocide is intermittently added to the industrial water to maintain a concentration of about 1 to 600 ppm, and wherein the concentration of the enzyme is monitored, and maintained at a level of at least about 2 ppm, said enzyme being derived from a preparation having an enzyme activity of at least about 500 units per milliliter.

4,684,470

APPARATUS AND METHOD FOR MEMBRANE-PERMEATION SEPARATIONS USING SEGMENTED FLOW

Thomas L. Peters, and Timothy S. Stevens, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 9, 1985, Ser. No. 764,268

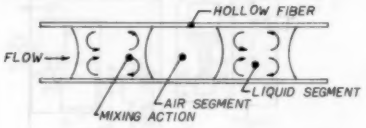
Int. Cl.[4] B01D *13/01*

U.S. Cl. 210—639 **10 Claims**

1. A method of increasing overall mass transport of a permeable component of a flowable stream of a multicomponent feed liquid through the walls of a plurality of elongate, continuously hollow membranes which are preferentially permeable to a component of the stream, in relation to other components of said stream, said method comprising:

(a) introducing a flowable stream of a multicomponent feed liquid capable of segmented flow into multiple flow channels formed by a plurality of elongate, continuously hollow membranes capable of sustaining segmented flow;

(b) introducing a fluid segmentation phase into the flow channels of the membranes effective to produce segmented flow beneficial to increasing the overall mass transport of a permeable component of the feed stream through the walls of the membranes;



(c) using membranes which over a range of flow rates of the feed stream effectively yield increased mass transport of the permeable component in response to segmented flow produced by step (b);

(d) maintaining the flow rate of the feed stream within a range which yields increased overall mass transport of the permeable component through the walls of the membranes through combined steps (b) and (c); and

(e) dispersing a permeated component away from the outer wall surfaces of the membranes at a sufficient rate to maintain a rate of increased overall mass transport achieved by steps (b)–(d) relative to the mass transport obtained using the same apparatus and operating conditions with the exception of step (b).

4,684,471

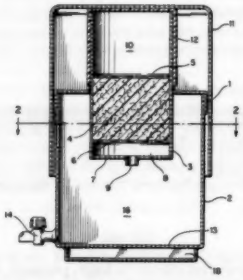
PROCESS FOR WATER PURIFICATION, AND A FILTER FOR CARRYING OUT THE PROCESS

Vladimir Manojlovic, Jurija Gagarina 162/25, 11070 Novi Beograd, Yugoslavia

Filed Jan. 17, 1986, Ser. No. 819,829

Int. Cl.[4] C02F *9/00*

U.S. Cl. 210—665 **4 Claims**



1. A process for water purification, intended for the purification of impure water to drinking water condition comprising the steps of

mixing from about 20–50 mg/l of a coagulant and from about 2–5 mg/l of an activated charcoal with a quantity of impure water as a first step in the purfication of the impure water,

passing the water through a filter medium composed of thoroughly cleaned plastic fibers of polyacrylonitrile

having a fineness of from about 4.5–9.0 deniers and a staple fiber length of from about 100–150 mm and a porosity of from about 78–85%, and

treating the filtrate with active chlorine in an amount sufficient to render the filtrate potable.

4,684,472

PRECIPITATION OF WASTE CHROMIUM COMPOUNDS UTILIZING AN AQUEOUS SULFIDE SOLUTION

Bruce W. Abbe, and Jack M. Cole, both of Borger, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 26, 1985, Ser. No. 819,082

Int. Cl.[4] C02F 1/52

U.S. Cl. 210—720 **6 Claims**

1. A method for reducing the chromium content of an aqueous waste containing significant amounts of at least one soluble chromium compound derived from water treated with a chromium-containing material as a corrosion inhibitor, comprising:

(a) contacting said aqueous waste, containing chromium, with an aqueous waste containing sodium sulfides, selected from the group consisting of sodium sulfide, sodium disulfide and mixtures thereof, produced by washing petroleum derivatives with an aqueous caustic solution to desulfurize the same, in an amount and for a time sufficient to convert a substantial amount of said soluble chromium compound to a solid precipitate containing chromium;

(b) settling the aqueous mixture formed in contacting step (a), in a settling pond, for a time sufficient to form a sludge phase containing said solid precipitate containing chromium and an aqueous phase; and

(c) separating said sludge phase from said aqueous phase.

4,684,473

LUBRICANT OIL COMPOSITION WITH IMPROVED FRICTION REDUCING PROPERTIES

Jan Bock, Bridgewater; Darrell W. Brownawell, Scotch Plains; Antonio Gutierrez, Mercerville; Max L. Robbins, South Orange; Harold Shaub, Berkeley Heights, and Peter L. Steyn, Madison, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Mar. 31, 1986, Ser. No. 846,007

Int. Cl.[4] C10M 125/24, 129/92

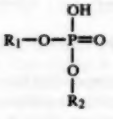
U.S. Cl. 252—49.8 **12 Claims**

1. A lubricating oil composition having improved friction reducing properties comprising:

(a) a major amount of a lubricating base oil;

(b) from about 0.1 to about 2.0 parts by weight of the reaction product of a dimer carboxylic acid having a total of about 24 to about 90 carbon atoms with about 9 to about 42 carbon atoms between carboxylic acid groups and a polyhydric alcohol having at least 3 to about 18 carbon atoms per 100 parts by weight of said lubricating oil composition, said reaction product being formed using from about 1 to about 3 moles of alcohol per mole of dimer acid; and

(c) from about 1 to about 10 parts by weight of an oil soluble compound per part of the reaction product of (b) wherein said oil soluble compound solubilizing the reaction product of (b) in said lubricating base oil and said oil soluble compound is selected from the group consisting of alkanols and alkyl phosphates, said alkyl phosphate being characterized by the formula:



wherein R_1 is an alkyl or alkyl aryl group of 6–18 carbons on the alkyl chain and R_2 is the same as R_1 or H.

4,684,474

ORGANOPHOSPHATE-CONTAINING ANTIFREEZE WITH BUFFER

Pak S. Leung, Highland Mills, and William N. Matulewicz, Montgomery, both of N.Y., assignors to First Brands Corporation, Danbury, Conn.

Filed Jul. 23, 1984, Ser. No. 633,209

The portion of the term of this patent subsequent to Sep. 23, 2003, has been disclaimed.

Int. Cl.[4] C09K 5/00

U.S. Cl. 252—75 **12 Claims**

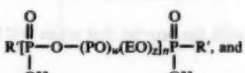
12. An antifreeze composition comprising:

(a) ethylene glycol,

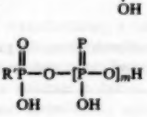
(b) a buffer consisting of salts of boric acid to provide a pH of between about 7 and about 10.5 for the composition; and,

(c) at least one alkylene oxide-containing organophosphate, in a corrosion inhibiting-effective amount, said organophosphate having a molecular weight of below about 10,000 and being selected from the group defined by the following structural formulae I, II and III:

(I)



(II)



(III)

wherein

R′=[RO(PO)$_x$(EO)$_y$] wherein R=H or alkyl, aryl, alkylaryl, arylalkyl, alkenyl or alkynyl having up to 24 carbon atoms,

PO=Propylene oxide radical,

EO=Ethylene oxide radical,

x=1 to 100,

y=0 to 100,

k=1 to 3, with the proviso that when k=3, at least one R′ group is removed from the phosphate ester by hydrolysis prior to or during use,

n=1 to 100,

w=0 to 100, with the proviso that when w≧1, x can be zero,

z=0 to 100,

m=1 to 10.

4,684,475

ORGANOPHOSPHATE AND SILICATE CONTAINING ANTIFREEZE

William N. Matulewicz, Montgomery, N.Y., assignor to First Brands Corporation, Danbury, Conn.

Filed Jul. 23, 1984, Ser. No. 633,444

Int. Cl.[4] C09K 5/00

U.S. Cl. 252—75 **13 Claims**

1. An antifreeze composition concentrate comprising:

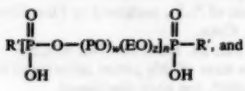
(a) alcohol,

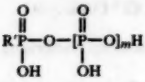
(b) at least one buffer selected from the group consisting of salts of boric, phosphoric benzoic, substituted benzoic, dibasic acids having 6 to 20 carbon atoms, and mixtures thereof,

(c) at least one alkylene oxide-containing organophosphate, in a corrosion inhibiting-effective amount, wherein said

organophosphate has a molecular weight below about 10,000 and is selected from the group defined by the following structural formulae I, II and III:

(I)


(II)


(III)

wherein

R′=[RO(PO)$_x$(EO)$_y$] wherein R=H or alkyl, aryl, alkylaryl, arylalkyl, alkenyl or alkynyl having up to 24 carbon atoms,

PO=Propylene oxide radical,

EO=Ethylene oxide radical,

x=1 to 100,

y=0 to 100,

k=1 to 3, with the proviso that when k=3, at least one R′ group is removed from the phosphate ester by hydrolysis prior to or during use,

n=1 to 100,

w=0 to 100, with the proviso that when w≧1, x can be zero,

z=0 to 100

m=1 to 10, and

(d) at least one silicate selected from the group consisting of organic and inorganic silicates, and mixtures thereof.

4,684,476

PYRIMIDINE DERIVATIVE AND LIQUID CRYSTAL COMPOSITION CONTAINING SAME

Kisei Kitano; Tetsuya Ogawa; Yoshito Furukawa, all of Yokohamashi; Naoyuki Yoshida, Kamakurashi; Shigeru Sugimori, Fujisawashi; Yasuyuki Goto, Yokohamashi; Toyoshiro Isoyama, Yokohamashi, and Kazunori Nigorikawa, Yokohamashi, all of Japan, assignors to Chisso Corporation, Japan

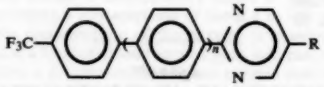
Filed Feb. 11, 1986, Ser. No. 828,338

Claims priority, application Japan, Feb. 27, 1985, 60-38328

Int. Cl.^{4} C09K *19/34*; C07D *239/00, 239/02*

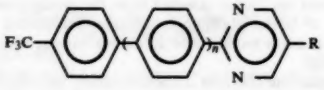
U.S. Cl. 252—299.61 **4 Claims**

1. A pyrimidine compound expressed by the formula



wherein n represents an integer of 0 or 1 and R represents an alkyl or alkoxy group of 1 to 10 carbon atoms.

4. A liquid crystal composition comprising at least two components, a first component including at least one liquid crystalline compound and a second component including at least one pyrimidine compound expressed by the formula



wherein n represents an integer of 0 or 1 and R represents an alkyl or alkoxy group of 1 to 10 carbon atoms.

4,684,477

PYRIDINE DERIVATIVES AND THEIR USE IN LIQUID CRYSTALS

Shigeru Sugimori, Fujisawashi; Kazunori Nigorikawa, and Tetsuya Ogawa, both of Yokohamashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan

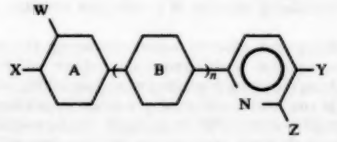
Filed Feb. 27, 1986, Ser. No. 833,717

Claims priority, application Japan, Mar. 6, 1985, 60-44208; Apr. 8, 1985, 60-74075; Apr. 22, 1985, 60-86121; Jul. 18, 1985, 60-159237; Dec. 20, 1985, 60-287136

Int. Cl.^{4} C09K *19/34, 19/54*; C07D *211/78, 211/72*

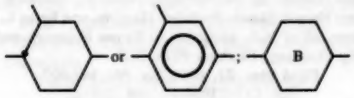
U.S. Cl. 252—299.61 **13 Claims**

1. A pyridine derivative expressed by the formula

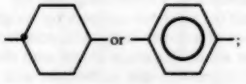

(I)

wherein W represents H or F; X represents F, Cl or an alkyl group or an alkoxy group each of 1 to 10 carbon atoms;

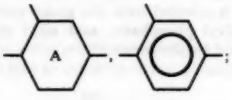
represents



represents



n represents 0 or 1; Y represents CN or an alkyl group or an alkoxy group each of 1 to 10 carbon atoms; Z represents F, Cl or H; and when Z is F or Cl, Y is limited to CN, excluding the case of compounds of the formula (I) wherein W represents H; X, an alkyl group or an alkoxy group each of 1 to 10 carbon atoms;



n, O; Y, an alkyl group of 1 to 10 carbon atoms or CN; and Z,H.

13. A liquid crystal composition having at least two components at least one of which is a pyridine derivative expressed by the formula (I) as set forth in claim 1.

4,684,478

NOVEL LIQUID CRYSTAL COMPOUND FOR HIGH TEMPERATURES

Shigeru Sugimori, Fujisawashi; Yasuyuki Goto, Yokohamashi; Toyoshiro Isoyama, Yokohamashi; Kazunori Nigorikawa, Yokohamashi; Tetsuya Ogawa, Yokohamashi; Kisei Kitano, Yokohamashi; Naoyuki Yoshida, Kamakurashi, and Yoshito Furukawa, Yokohamashi, all of Japan, assignors to Chisso Corporation, Tokyo, Japan

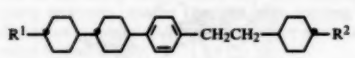
Filed Jan. 6, 1986, Ser. No. 816,740

Claims priority, application Japan, Jan. 7, 1985, 60-715

Int. Cl.[4] C09K *19/30;* C07C *13/00, 15/12*

U.S. Cl. 252—299.63 4 Claims

1. A 1-(trans-4'-alkylcyclohexyl)-2-4''-[trans-4'''-(trans-4''''-alkylcyclohexyl)cyclohexylphenyl]ethane expressed by the formula



(I)

wherein R^1 and R^2 each represent an alkyl group of 1 to 10 carbon atoms.

4,684,479

SURFACTANT MIXTURES, STABLE GAS-IN-LIQUID EMULSIONS, AND METHODS FOR THE PRODUCTION OF SUCH EMULSIONS FROM SAID MIXTURES

Joseph S. D'Arrigo, 23A Brickyard Rd., Farmington, Conn. 06032

Filed Aug. 14, 1985, Ser. No. 765,917

Int. Cl.[4] B03D *1/00;* B01F *17/30, 17/36*

U.S. Cl. 252—307 13 Claims

1. A surfactant mixture for the production of stable gas-in-liquid emulsions comprising:

(a) a member selected from the group consisting of glycerol monoesters of saturated carboxylic acids containing from about 10 to about 18 carbon atoms and aliphatic acohols containing from about 10 to about 18 carbon atoms;

(b) a sterol-aromatic acid ester;

(c) a member selected from the group consisting of sterols, terpenes, bile acids and alkali metal salts of bile acids;

(d) a member selected from the group consisting of sterol esters of aliphatic acids containing from 1 to about 18 carbon atoms; sterol esters of sugar acids; esters of sugar acids and aliphatic alcohols containing from about 10 to about 18 carbon atoms; esters of sugars and aliphatic acids containing from about 10 to about 18 carbon atoms; sugar acids; saponins; and sapogenins; and

(e) a member selected from the group consisting of glycerol, glycerol di- or triesters of aliphatic acids containing from about 10 to about 18 carbon atoms and aliphatic alcohols containing from about 10 to about 18 carbon atoms;

said components being present in said mixture in a weight ratio a:b:c:d:e of 2–4:0.5–1.5:0.5–1.5:0–1.5:0–1.5.

4,684,480

CERAMIC BONDED NEUTRON ABSORBER PLATES OF BORON CARBIDE AND FREE CARBON

Alfred Lipp, Bad Worishofen; Klaus Reinmuth, Durach, and Detlef von Struensee, Kempten, all of Fed. Rep. of Germany, assignors to Elektroschmelzwerk Kempten GmbH, Munich, Fed. Rep. of Germany

Filed Nov. 13, 1984, Ser. No. 670,760

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1984, 3403257

Int. Cl.[4] G21F *1/06;* C04B *35/68*

U.S. Cl. 252—478 2 Claims

1. A ceramically bonded neutron absorber article of boron carbide and free carbon, comprising from about 40 to 60% by volume boron carbide+silicon carbide in B_4C:SiC ratio of from about 9:1 to 1:9 and from about 10 to 20% by volume of free carbon, the remainder being pores, having a density of from about 1.5 to 2.2 g/cm^3 and a flexural strength of from about 20 to 50 N/mm^2 at room temperature, measured according to the 3-point method, which, after immersion for about 3000 hours in boiling water, drops by less than about 40% of the initial value.

4,684,481

ELECTRO-CONDUCTIVE ELASTOMERIC MATERIALS

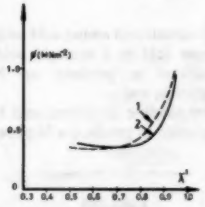
John Jackson, Lesmahagow, and Seyed A. Angadjivand, Kelvindale, both of Scotland, assignors to University of Strathclyde, Glasgow, Scotland

Filed Jan. 22, 1986, Ser. No. 821,279

Claims priority, application United Kingdom, Jan. 29, 1985, 8502202

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—510 9 Claims



1. A method of manufacturing a cured and crosslinked silicone polymer electro-conductive elastomeric material comprising the steps of selecting as constituents for the electro-conductive material a silicone polymer gum, graphitic carbon particles, curing and crosslinking agents and a mesogenic oil which is synthetic, unsaturated, of the oxalic moiety, and has two oleic chains, forming an intimately mixed admixture of said constituents, and subsequently subjecting the admixture to settled conditions over a predetermined time interval to effect cross-linking and curing of the admixture.

4,684,482

ORALLY EFFECTIVE ION CHELATORS

Donald E. Green, Sunnyvale, Calif., assignor to Oral-D (L.P.), Boston, Mass.

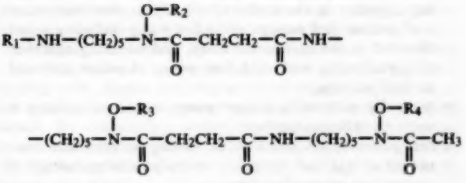
Filed Jan. 26, 1984, Ser. No. 574,482

The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.

Int. Cl.[4] C09F *5/00, 5/06*

U.S. Cl. 260—404.5 1 Claim

1. A compound of the formula:



wherein:

R_1 is acyl of the formula —(C=O)—CH_3; and

R_2, R_3 and R_4 are each —(C=O)C_7H_{15}.

4,684,483

PREPARATION OF N-SUBSTITUTED AMINO ACIDS

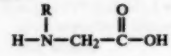
Thomas J. Richard, University City, and William H. Miller, Glendale, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Sep. 23, 1985, Ser. No. 778,840
Int. Cl.[4] C07F 9/36
U.S. Cl. 260—502.5 F **3 Claims**

1. A process which comprises:

bringing together under reaction conditions glyoxal, in a medium comprising a polar solvent, with a source of sulfur dioxide and a primary amine represented by the formula:

where R is an alkyl group, to produce an N-substituted amino acid represented by the formula:



contacting said N-substituted amino acid with formaldehyde and phosphorous acid in a strongly acid system under reaction conditions to produce an N-alkyl-N-phosphonomethylglycine, and

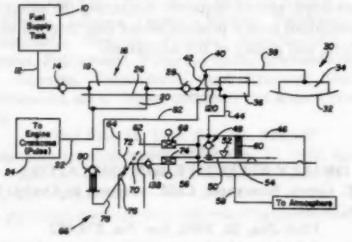
dealkylating under alkaline conditions said N-alkyl N-phosphonomethylglycine to produce a N-phosphonomethylglycine salt.

4,684,484

PRIMER SYSTEM AND METHOD FOR PRIMING AN INTERNAL COMBUSTION ENGINE

Thomas G. Guntly, Hartford, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed May 27, 1986, Ser. No. 866,767
Int. Cl.[4] F02M 1/16
U.S. Cl. 261—35 **16 Claims**



1. A carburetion system for an internal combustion engine comprising:

a diaphragm carburetor comprising a carburetor body, an air-fuel passage in the carburetor body adapted to communicate with an engine combustion chamber, a fuel metering chamber in the carburetor body in communication with said air-fuel passage and a fuel pump including a fuel chamber in the carburetor body, said metering chamber communicating with said fuel pump chamber and said air-fuel passage,

a manually actuatable primer pump means comprising a variable volume chamber,

a fuel pump outlet check valve having an inlet side connected to said fuel pump and an outlet side connected to said primer pump chamber,

a priming passageway in said carburetor body connected to said air-fuel passage,

a primer check valve having an inlet connected to said primer pump means chamber and an outlet connected to said priming passageway, and

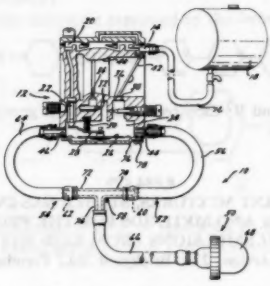
an inlet passageway in said carburetor body communicating between the outlet side of said fuel pump outlet check valve and said metering chamber.

4,684,485

CARBURETOR FUEL PRIMER

William A. Scott, Mt. Zion, Ill., assignor to Tillotson, Ltd., Tralee, Ireland

Filed Aug. 26, 1986, Ser. No. 900,435
Int. Cl.[4] F02M 1/16
U.S. Cl. 261—35 **15 Claims**



1. A fuel primer for a carburetor having a metering chamber, the metering chamber having an restricted inlet and an outlet relatively unrestricted as compared to said inlet, and being coupled with a fuel source, and a combustion path, the primer comprising:

means coupled with said restricted inlet for enabling one way flow into said metering chamber through said restricted inlet;

second means coupled with said unrestricted outlet for enabling one way flow from said metering chamber through said unrestricted outlet; and

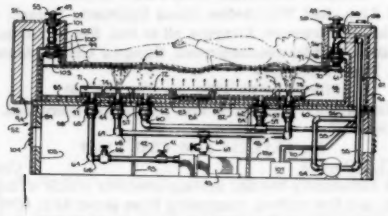
third means coupled with said first and second means for introducing a pressurized and depressurized flow through said primer such that fuel is drawn into said metering chamber from said fuel source.

4,684,486

DISTRIBUTOR FOR IMPROVED WATER THERAPY

Dominic A. Ricchio, 6021 56th Ave., Kenosha, Wis. 53142

Division of Ser. No. 447,763, Dec. 8, 1921, Pat. No. 4,635,620, which is a continuation-in-part of Ser. No. 371,456, Apr. 23, 1982, abandoned. This application Aug. 19, 1986, Ser. No. 898,028
Int. Cl.[4] B01F 3/04
U.S. Cl. 261—36.1 **6 Claims**



1. A distributor fitting for disposition in a waterbed mattress and for connection to water inlet piping, water outlet piping,

and air inlet piping to provide an aspirated body of water for hydrotherapy, the distributor fitting having:

two opposite sides each facing away from the other;

two inlet openings for water formed in a first one of the sides for connection to the water inlet piping;

an inlet opening for air formed in the first one of the sides for connection to the air inlet piping;

an outlet opening for wataer formed in the first one of the sides and adapted for connection to the water outlet piping to convey water out of the interior of the waterbed mattress when the distributor fitting is disposed therein;

a plurality of outlet openings for water formed in a second one of the sides, the plurality of outlet openings for water being relatively smaller and more numerous than the two inlet openings for water to divide water supply streams into smaller streams for hydrotherapy;

a plurality of outlet openings for air formed in the second one of the sides, the plurality of outlet openings for air being relatively smaller than the inlet opening for air to divide an air supply stream into smaler streams for aspirated hydrotherapy;

means forming a first chamber in communication with the two inlet openings and with the plurality of outlet openings for water for conveying water therebetween;

means forming a second chamber in communication with the inlet opening and with the plurality of outlet openings for air for conveying air therebetween; and

means forming an open compartment around the outlet opening for water in the first one of the sides to protect the streams of air and water provided for hydrotherapy from the effects of drawing water through the outlet opening in the first one of the sides.

4,684,487

PROCESS FOR THE CONTROL OF PROCESS PARAMETERS IN THE PRODUCTION OF STRETCHED FOILS

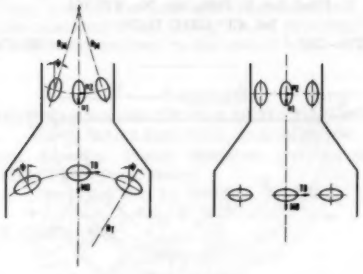
Wolfgang Gawrisch, Gau-Bischofsheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 12, 1985, Ser. No. 764,675

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1984, 3430439

Int. Cl.[4] B29C *55/12*

U.S. Cl. 264—22 **11 Claims**



1. A process for the production of a stretched foil web having uniform orientation conditions in the molecular chains of the foil, comprising the steps of:

optically generating a scatter pattern of a stretched foil web at at least two measurement positions in at least one of the longitudinal and transverse directions of said web;

measuring the rotation of said scatter pattern in relation to a preferred direction, said rotation of said scatter pattern being determined as a measure of the change in the uniform orientation conditions of the stretched foil web; and

utilizing said measured rotation to regulate the temperature of a temperature field for thermally fixing said foil web in such a manner that an anisotropy condition of the stretched foil web is changed into an isotropy condition with uniform orientation conditions in the molecular chains of the foil in said preferred direction.

4,684,488

METHOD AND APPARATUS FOR CONTROLLED SUPPLY OF COLOR CONCENTRATES INTO AN EXTRUDER TO OBTAIN A PLASTIC PRODUCT OF DESIRED COLORATION

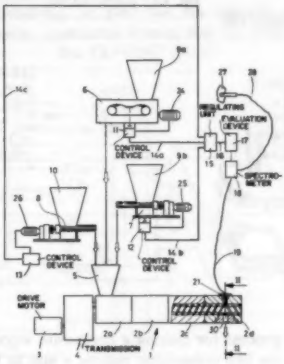
Joachim Rudolph, Weil der Stadt, Fed. Rep. of Germany, assignor to Werner & Pfleiderer, Fed. Rep. of Germany

Filed Feb. 3, 1986, Ser. No. 825,232

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1985, 3505036

Int. Cl.[4] B29G *47/92*

U.S. Cl. 264—40.2 **7 Claims**



1. A method of regulating the drive of a plurality of dosaging devices for the controlled feeding of color concentrates and additives into a supply hopper of a screw extruder for producing a mixed product of determined composition and coloration, said method comprising:

periodically measuring the coloration of the mixed product at an outlet of the extruder by a spectrometer connected to a measurement probe,

comparing a light signal representing the measured coloration of the mixed product with a light signal representing the coloration of the desired product of determined composition, and

adjusting the supply of the concentrates and additives, as necessary to the mixed product in the extruder while constantly maintaining the flow rate of the mixed product so that the measured coloration of the product at the outlet of the extruder is the same as the coloration of the desired product and thereby the composition of the product will be in correspondence with the desired composition.

4. Apparatus for producing an extruded plastic product of determined composition and coloration comprising a screw extruder including a housing having an inlet and an outlet, drive means for driving the screw extruder at a substantially constant velocity, a hopper at said inlet, first means for introducing solid, plastic particles into said hopper, second means for introducing color concentrates into said hopper and third means for introducing additives into said hopper, control means connected to each of said first, second and third means for regulating the output therefrom into the hopper, regulating means connected to said control means for operating said control means, a measurement probe mounted in said housing in proximity to said outlet for viewing the product in the extruder, a spectrometer connected to said probe for cooperat-

ing therewith to produce an output light signal indicative of the coloration of said product, evaluation means connected to said spectrometer for evaluating said output light signal in comparison with the output light signal of a desired product of determined composition and coloration, said regulating means being connected to said evaluation means for operating said control means, when the output light signal of the actual product in the extruder is different from the output light signal of the desired product in order to equalize said light signals.

4,684,489

PROCESS FOR MAKING A COMPOSITE WOOD PANEL

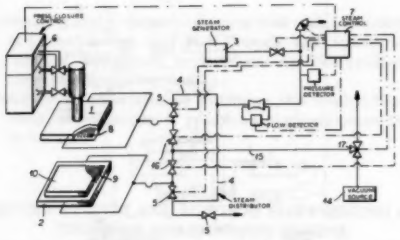
Karl Walter, Kempen, Fed. Rep. of Germany, assignor to G. Siempelkamp GmbH & Co., Krefeld, Fed. Rep. of Germany

Filed May 13, 1986, Ser. No. 862,806

Claims priority, application Fed. Rep. of Germany, May 15, 1985, 3517502

Int. Cl.[4] B29C *59/02*

U.S. Cl. 264—101 **10 Claims**



1. In a process for making a composite wood panel, fiberboard or the like comprising putting a mat to be pressed between two press platens of a press, bringing said press platens together until they are in an initial compressing position during an initial compression time interval for compressing said mat, feeding steam through a plurality of steam orifices in both of said press platens to said mat during a subsequent steam pressing step, said steam pressing step being characterized by intermittant flushing events in which said steam issues from said steam pressing orifices of one of said press platens and flows through said mat and also into said steam orifices of the other one of said press platens which temporarily are out off from the source of said steam, further bringing said press platens into a final compression position defined by the thickness of the product panel, continuing by feeding in said steam from said steam orifices of both of said press platens for the balance of said steam pressing step for the final pressing of said mat, and during a final compression step said mat is exposed to the action of a vacuum source connected to at least one of said press platens to dry said mat, wherein said vacuum source can be connected to a system for feeding in said steam in place of said steam generator, the improvement wherein said mat during said initial compression time interval t_0–t_1 is first compressed with heated ones of said press platens in a first compression step in which at least 50% of the density of said product panel is attained, said mat is further compressed in a second one of said compression steps with said steam fed in from both of said press platens with a steam pressure of between 1 to 3 bar until a density of from 110 to 140% of the value of said density attained in said first compression step has been reached, and in a third one of said compression steps the feed of said steam is interrupted, said density attained in said second compression step being maintained and subsequently said steam pressing step is performed in a steam compression time interval t_3–t_4 with a pressure of said steam which is greater than said steam pressure of said second compression step.

4,684,490

PROCESS FOR PREPARATION OF POLYURETHANE CONDOMS

Robert A. Taller, and Charles W. McGary, Jr., both of Centerville, Ohio, assignors to Deseret Medical, Inc., Franklin Lakes, N.J.

Continuation of Ser. No. 555,861, Nov. 28, 1983, abandoned. This application Sep. 2, 1986, Ser. No. 903,822

Int. Cl.[4] B29C *13/00*

U.S. Cl. 264—296 **7 Claims**

1. A process for producing polyurethane condoms with walls of substantially uniform thickness utilizing a single dipping step, characterized by the steps of

(a) establishing a single dipping bath, said bath comprising

(1) a solvent solution of a polyurethane polymer or prepolymer;

(2) said polymer or prepolymer being the reaction product of a polyisocyanate and at least one long chain polyol;

(3) said polyol being amorphous and noncrystalline at room temperature and having an average molecular weight within the range of between about 500 and 5000;

(4) said polyol having an average hydroxy number of within the range of between about 225 and 22.4; and

(5) said polyisocyanate having an NCO/OH ratio of within the range of between about 0.95/1 and 1.1/1.

(b) dipping molds in which condoms are to be formed in said single dipping bath for a period of time within the range of between about 30 and 60 seconds for depositing a polyurethane film in the form of a condom on each of said molds;

(c) withdrawing said molds from said single dipping bath at the rate of within the range of between about 16 and 90 centimeters per minute;

(d) curing said deposited film in the form of a condom on each of said molds by exposure to elevated temperatures for a time sufficient to effect said cure;

(e) cooling the said cured film on said molds;

(f) forming an integral cuff at the base of the said film on each of said molds; and

(g) removing said deposited film in the form of a condom with an integral cuff from each of said molds.

4,684,491

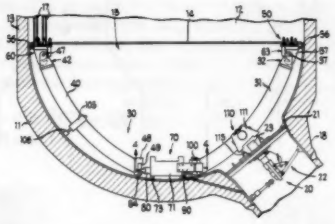
NOZZLE SEAL RETAINING ASSEMBLY AND POSITIONING ASSEMBLY THEREFOR

John A. Rylatt, Monroeville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 9, 1986, Ser. No. 817,363

Int. Cl.[4] G21C *13/00*

U.S. Cl. 376—203 **20 Claims**



1. In a nuclear steam generator vessel having a part-spherical bottom wall cooperating with a horizontal tube sheet and a vertical divider plate to define a plenum having a nozzle, apparatus for retaining a nozzle seal in the nozzle against displacement into the plenum comprising: rigid beam means disposed in the plenum, attachment means connecting said beam means to the nozzle seal, anchor means connecting said beam means to the tube sheet, and coupling means bracing said beam means against the divider plate, whereby said beam means is securely braced between the tube sheet and the divider plate

for transferring thereto forces coupled to said beam means from the nozzle seal.

4,684,492

REPAIR FIXTURE

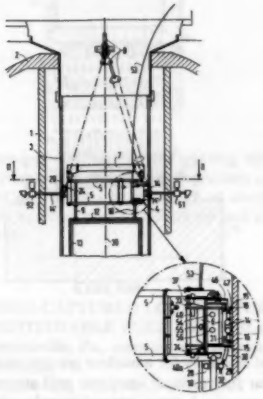
Rainer Kunz; Jakob Stauner, both of Nuremburg, and Robert Weber, Uttenreuth, all of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim/Ruhr, Fed. Rep. of Germany

Filed May 17, 1985, Ser. No. 735,568

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1984, 29682[U]

Int. Cl.[4] G21C *13/06;* **F16L** *55/18;* **F17D** *3/14*

U.S. Cl. 376—203 **22 Claims**



1. In a water-cooled nuclear reactor including an openable reactor pressure vessel having a wall, feedwater distributors passing through the pressure vessel wall for flooding the pressure vessel, and a core barrel for fuel elements disposed below the feedwater distributors in the reactor pressure vessel, a repair fixture comprising a sealing box enclosing the feedwater distributors in the opened, flooded pressure vessel, means connected to said sealing box for pressing said sealing box liquid-tightly against the reactor pressure vessel wall enclosing at least some of the feedwater distributors, and evacuating means connected to said sealing box for emptying the feedwater distributors enclosed by said sealing box.

4,684,493

METHOD AND DEVICE FOR DETECTING DEFECTIVE NUCLEAR FUEL ELEMENTS

Alain Gravelle, Plessis Robinson, France, assignor to FRAGEMA, Paris, France

Filed Dec. 16, 1983, Ser. No. 562,057

Int. Cl.[4] G21C *17/00*

U.S. Cl. 376—252 **8 Claims**

1. A method for detecting defects in nuclear fuel elements of the type having a fluid tight sheath and a stack of nuclear fuel pellets in said sheath separated by a plenum chamber from an end plug closing an end of said sheath, comprising the steps of: (a) maintaining said fuel elements immersed in a body of liquid; (b) applying to the sheath, through said end plug, a train of ultrasonic waves having a frequency and duration such that propagation takes place as Lamb waves; (c) detecting echoes of said train; (d) repeating steps (b) and (c) for different frequencies, some of them are in the range of frequencies which corresponds to substantial absorption by water which may be contained in the sheath and others of them are in a second range which corresponds to formation of an echo at a mechanical fault in the sheath.

4,684,494

ULTRAFILTRATION DEVICE IN A PRESSURIZED WATER NUCLEAR REACTOR

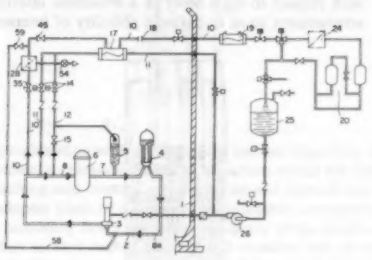
Philippe Dagard, Marly le Roi, France, assignor to Framatome & Cie., Courbevoie, France

Filed Sep. 24, 1984, Ser. No. 653,805

Claims priority, application France, Sep. 23, 1983, 83 15130

Int. Cl.[4] G21C *19/30*

U.S. Cl. 376—313 **4 Claims**



1. In a pressurized water nuclear reactor having a primary circuit filled with primary cooling water, inside a safety containment, a volumetric and chemical circuit for withdrawing and treating said primary water branching from a cold branch of the primary circuit a part of which, located inside said safety containment, comprises cooling and pressure reducing means, the improvement consisting of an ultrafiltration device arranged inside said safety containment in a withdrawal pipeline of said volumetric and chemical circuit upstream of said cooling and pressure reducing means and comprising an enclosure and an ultrafiltration wall placed inside said enclosure, said withdrawal pipeline being connected to said enclosure of the ultrafiltration device on both sides of said ultrafiltration wall for circulating water withdrawn from said cold branch of said primary circuit in contact with a face constituting an entry face of the wall and for receiving the water separated from impurities by said ultrafiltration wall constituting the filtrate, a recycling circuit being arranged for circulating the concentrate constituted by remaining water not separated from the impurities, in contact with said entry face of said ultrafiltration wall.

4,684,495

FUEL ASSEMBLY BOTTOM NOZZLE WITH INTEGRAL DEBRIS TRAP

John F. Wilson, Murrysville Boro; Robert K. Gjertsen, Monroeville Boro, and Samuel Cerni, Churchill Boro, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 16, 1984, Ser. No. 672,041

Int. Cl.[4] G21C *3/30, 19/30, 15/00*

U.S. Cl. 376—352 **13 Claims**

1. In a fuel assembly for a nuclear reactor including a plural-

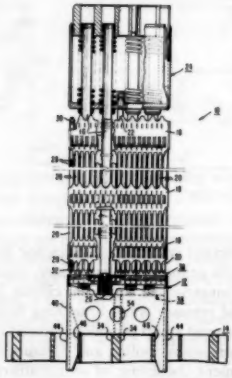
ity of nuclear fuel rods, at least one grid supporting said fuel rods in an organized array, and at least one guide thimble supporting said grid, an improved bottom nozzle disposed adjacent and below said grid, supporting said guide thimble and adapted to allow flow of liquid coolant into said fuel assembly, said improved bottom nozzle comprising:

(a) means spaced below said grid and a lower end of said fuel rods and supporting said guide thimble and allowing flow of coolant into said fuel assembly;

(b) means mounted about said supporting means and extending toward but spaced from said grid and lower end of said fuel rods so as to define an open region between said supporting means and said grid and lower end of said fuel rods; and

(c) a trap disposed within said open region and on said supporting means, said trap being adapted for passage of said guide thimble therethrough to said supporting means and flow of said coolant therethrough for capturing and retaining debris carried by said flowing coolant within said trap to substantially prevent entry of debris into said fuel assembly, said trap including

(i) a structure disposed within and extending across said open region adjacent said supporting means, said structure being composed of a plurality of straps aligned with respect to each other in a crisscross interlocking arrangement so as to define a plurality of intersections



disposed below and aligned respectively with said fuel rods, said straps also defining wall portions forming a multiplicity of small cells each being open at opposite ends and defining a central channel for passage of coolant flow therethrough to said fuel assembly, said wall portions of each cell being defined in oppositely-disposed interconnected pairs thereof, some of said wall portions being common to two adjacent cells, and

(ii) means disposed in each of said cells and extending into said channel thereof for capturing and retaining within said structure debris carried into said cells by said coolant flowing therethrough, said capturing and retaining means in each cell being in the form of spring-like fingers punched out of respective ones of said wall portions of said cell and bent to extend both vertically and horizontally into said channels of said cell and other cells adjacent thereto, one pair of said fingers on one pair of said wall portions in a cell being disposed downstream from and in overlapping relation with another pair of said fingers on another pair of said wall portions in said cell such that a fuel rod cannot enter said cell, said wall portions which are common to two adjacent cells having a pair of said fingers punched out therefrom being located upstream and downstream from one another and extending oppositely into separate ones of said two adjacent cells.

4,684,496

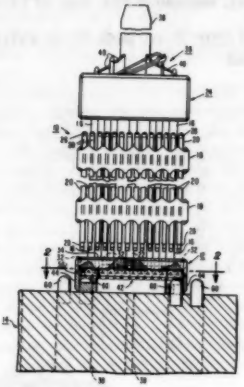
DEBRIS TRAP FOR A PRESSURIZED WATER NUCLEAR REACTOR

John F. Wilson, Murrysville Boro, and Robert F. Barry, Monroeville Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 16, 1984, Ser. No. 672,040

Int. Cl.[4] G21C *3/30, 19/30, 15/00*

U.S. Cl. 376—352 **14 Claims**



1. In a fuel assembly for a nuclear reactor including a plurality of nuclear fuel rods, at least one grid supporting said fuel rods in an organized array, an end nozzle with a transverse adapter plate disposed adjacent said grid and an end of said fuel rods and having holes which allow flow of liquid coolant through said end nozzle adapter plate and into said fuel assembly, a trap for capturing and retaining debris carried by said flowing coolant to prevent entry of debris into said fuel assembly, said debris trap comprising:

(a) a structure disposed across said end nozzle and adjacent said adapter plate on an opposite side thereof from said grid and said end of said fuel rods, said structure being composed of a plurality of straps aligned with respect to each other in a crisscross interlocking arrangement and defining wall portions forming a multiplicity of small cells each being open at opposite ends and defining a central channel for passage of coolant flow therethrough to said adapter plate of said end nozzle, said wall portions of each cell being defined in oppositely-disposed interconnected pairs thereof, some of said wall portions being common to two adjacent cells; and

(b) means defined in each of said cells for capturing and retaining within said structure debris carried into said cells by said coolant flowing therethrough, said capturing and retaining means in each said cell being in the form of spring-like fingers punched out of respective ones of said wall portions of said cell and bent to extend both vertically and horizontally into said channels of said cell and other cells adjacent thereto, one pair of said fingers on one pair of said wall portions in a cell being disposed downstream from and in overlapping relation with another pair of said fingers on another pair of said wall portions in said cell such that a fuel rod cannot enter said cell, said wall portions which are common to two adjacent cells having a pair of said fingers punched out therefrom being located upstream and downstream from one another and extending oppositely into separate ones of said two adjacent cells.

4,684,497

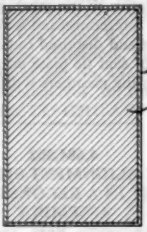
CADMIUM OXIDE GLAZED NUCLEAR FUEL PELLET AND GLAZING COMPOSITION

Walston Chubb, Franklin Township, Westmoreland County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 572,711, Jan. 20, 1984, abandoned. This application Jul. 7, 1986, Ser. No. 883,030

Int. Cl.[4] G21C *3/00*

U.S. Cl. 376—419 27 Claims



1. A glaze forming composition for glazing nuclear fuel pellets with a burnable absorber, said composition comprising cadmium oxide (CdO) present in the range of about 50 to 95 percent by weight as a first burnable absorber and at least one glaze forming oxide.

4,684,498

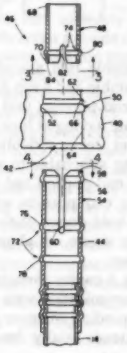
GUIDE THIMBLE CAPTURED LOCKING TUBE IN A RECONSTITUTABLE FUEL ASSEMBLY

Gary E. Paul, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 29, 1985, Ser. No. 717,991

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—446 12 Claims



1. In a reconstitutable fuel assembly including a top nozzle with an adapter plate having at least one passageway, at least one guide thimble with an upper end portion, and an attaching structure for mounting said top nozzle adapter plate in releasable locking engagement upon said guide thimble upper end portion, the improvement which comprises:

(a) a locking tube mounted within said guide thimble upper end portion for movement relative thereto between an upper locking position wherein said adapter plate and guide thimble upper end portion are maintained in said locking engagement and a lower unlocking position wherein said adapter plate is releasable from said guide thimble upper end portion; and

(b) cooperating means defined on said locking tube and said guide thimble for releasably retaining said locking tube at either of said upper and lower positions in said guide thimble.

4,684,499

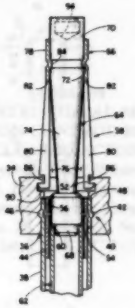
BURNABLE ABSORBER ROD RELEASABLE LATCHING STRUCTURE

Robert K. Gjertsen, Monroeville Boro, and John F. Wilson, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 10, 1985, Ser. No. 807,142

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—446 11 Claims



1. In combination with an elongated nuclear reactivity control member, a releasable latching structure useful for releasably attaching said control member at an end thereof to a top nozzle adapter plate of a nuclear fuel assembly, comprising:

(a) a mounting body including an inner plug portion attached to said end of said control member and an outer end portion disposed axially outward from said inner plug portion and said end of said member; and

(b) a spring latch disposed about said mounting body and being attached to said outer end portion thereof, said spring latch having at least one latch finger extending toward said inner plug portion of said body and being movable toward and away from said body between an outer latching position in which said finger is adatped to engage a fuel assembly top nozzle adapter plate and retain said elongated member in a stationary relationship with respect to the adapter plate and an inner unlatching position in which said finger is adapted to disengage from the adapter plate and allow removal of said member from the adapter plate.

4,684,500

GUIDE THIMBLE CAPTURED LOCKING TUBE IN A RECONSTITUTABLE FUEL ASSEMBLY

Robert K. Gjertsen, Monroeville; John M. Shallenberger, Fox Chapel, and John F. Wilson, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 12, 1985, Ser. No. 775,208

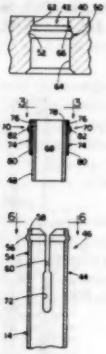
Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—446 13 Claims

1. In a reconstitutable fuel assembly including a top nozzle with an adapter plate having at least one passageway, at least one guide thimble with an upper end portion, and an attaching structure for mounting said top nozzle adapter plate in releasable locking engagement upon said guide thimble upper end portion, said attaching structure including a groove defined in said adapter plate passageway, a bulge defined in said guide thimble upper end portion and at least one slot axially defined in said guide thimble upper end portion so as to allow inward elastic collapse of said upper end portion to permit insertion and withdrawal of said bulge into and from a locking relation

with said groove in said adapter plate passageway, the improvement which comprises:

(a) a locking tube mounted within said guide thimble upper end portion for movement relative thereto between an upper locking position wherein said adapter plate and guide thimble upper end portion are maintained in said locking engagement and a lower unlocking position wherein said adapter plate is releasable from said guide thimble upper end portion; and



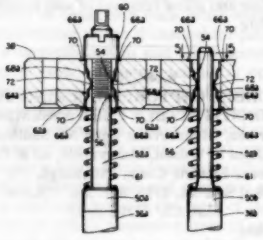
(b) at least one protrusion attached on said locking tube so as to extend outwardly thereof and through said slot in said guide thimble upper end portion, said protrusion being yieldable for engaging said passageway groove of said adapter plate to retain said locking tube at its upper locking position and for releasing from said passageway groove to allow movement of said locking tube to its lower unlocking position.

4,684,501

COMPLIANT INSERTS MOUNTED IN UPPER TIE PLATE OF BWR FUEL ASSEMBLY

Chun K. Lui, Monroeville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 27, 1985, Ser. No. 802,560
Int. Cl.[4] G21C *3/32*
U.S. Cl. 376—446 **22 Claims**



1. In a fuel assembly having a plurality of fuel rods, a plurality of grid structures axially spaced from one another along said fuel rods and supporting said fuel rods in a side-by-side spaced array, and tie plates disposed at opposite ends of said fuel rods, at least one of said tie plates having a plurality of holes defined by endless sidewalls formed therethrough between opposite sides of said tie plate and in an array which matches that of said fuel rods, each of said fuel rods having a pair of end plugs sealing opposite ends thereof, at least one of said end plugs having an extension member thereon which extends axially outward therefrom, a compliant insert comprising:

a plurality of spring members disposed in each of said holes of said one tie plate and engaged with said tie plate and said end plug extension member so as to support said extension member within said hole in spaced relationship from said hole sidewall, said spring members being resiliently flexible for accommodating relative angular movement between said each end plug extension member and said tie plate and, at the same time, allowing axial movement of one relative to the other; and

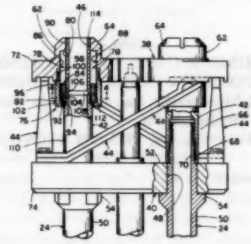
a plurality of tabs interconnected with opposite ends of said spring members and disposed outside of each hole along opposite sides of said tie plate adjacent to each hole for securing said spring members within said holes of said tie plate.

4,684,502

TOP NOZZLE ALIGNMENT SLEEVE CAPTURE ARRANGEMENT IN A RECONSTITUTABLE FUEL ASSEMBLY

John F. Wilson, Murrysville Boro, and Robert K. Gjertsen, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 19, 1985, Ser. No. 746,495
Int. Cl.[4] G21C *3/32*
U.S. Cl. 376—446 **11 Claims**



1. In a reconstitutable fuel assembly having at least one control rod guide thimble and a top nozzle, said guide thimble including an upper end portion, said top nozzle including an upper hold-down plate having at least one passageway, at least one tubular alignment sleeve slidably extending through said passageway and being attachable to and detachable from said guide thimble upper end portion and means supported on said guide thimble upper end portion which, in turn, yieldably mounts said upper hold-down plate for relative movement along said alignment sleeve, an alignment sleeve capture arrangement comprising:

(a) means defining a cavity through said upper hold-down plate and in communication with said passageway therein, said cavity surrounding an upper portion of said alignment sleeve which extends axially through said cavity and said passageway;

(b) upper means on said upper hold-down plate surrounding said alignment sleeve upper portion and defining an upper limit of said cavity;

(c) lower means on said upper hold-down plate surrounding said alignment sleeve upper portion, spaced below said upper limit defining means, and defining a lower limit of said cavity, one of said upper and lower cavity limit defining means being releasably attached to said upper hold-down plate for facilitating assembling and dissembling of said top nozzle; and

(d) enlarged means attached on said alignment sleeve upper portion and having an outside diameter greater than respective inside diameters of said upper and lower cavity limit defining means but less than the inside diameter of said cavity such that said enlarged means can slide within

said cavity with said alignment sleeve between said upper and lower limits thereof as said upper hold-down plate moves along said alignment sleeve and will retain said alignment sleeve slidably attached to said hold-down plate when said sleeve is detached from said guide thimble upper end portion.

4,684,503

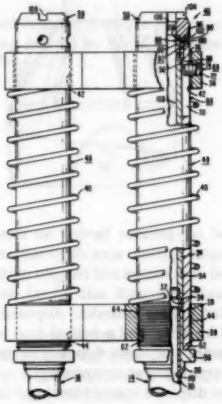
RECONSTITUTABLE NUCLEAR REACTOR FUEL ASSEMBLY WITH UNITARY REMOVABLE TOP NOZZLE SUBASSEMBLY

John M. Shallenberger, Fox Chapel Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 457,790, Jan. 13, 1983, abandoned. This application Nov. 20, 1984, Ser. No. 673,681

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—446 **20 Claims**



1. In a reconstitutable fuel assembly having at least one control rod guide thimble and a top nozzle, said guide thimble including an upper extension, said top nozzle including at least one hold-down spring, an upper hold-down plate and a lower adapter plate, an improved attaching structure removably mounting said top nozzle as a unitary subassembly on said guide thimble, said attaching structure comprising:

(a) a coupling member interfitting said lower adapter plate, said upper hold-down plate and said hold-down spring disposed between said plates so as to capture and retain said plates and spring together as a unitary subassembly in which said upper plate is slidably movable along said coupling member relative to said lower plate with said spring biasing said upper plate away from said lower plate, said coupling member having spaced apart upper and lower portions with a central passageway extending therebetween for slidably receiving said upper extension of said guide thimble therein in a nonattached relationship in which said coupling member is slidably movable relative to said guide thimble extension for respectively inserting and removing said coupling member on and from said guide thimble extension;

(b) means on said upper extension of said guide thimble supporting said coupling member at its lower portion so as to limit downward movement of said coupling member relative to said guide thimble extension and thereby insertion of said coupling member thereon without limiting upward movement of said coupling member relative to said guide thimble extension and thereby removal of said coupling member therefrom; and

(c) a detachable member releasably applied to said upper portion of said coupling member and disengagably engaged with said upper extension of said guide thimble so as to removably lock said coupling member to said guide thimble extension such that removal of said detachable member from both said coupling member and said guide thimble extension is required before said coupling member and said upper hold-down plate, said hold-down spring and said lower adapter plater retained thereon can be removed therewith as a unitary subassembly from said upper extension of said guide thimble.

4,684,504

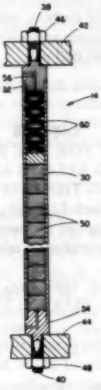
BOW RESISTANT STRUCTURAL MEMBER FOR FUEL ASSEMBLIES IN NON-CONTROL ROD LOCATIONS OF A NUCLEAR REACTOR CORE

John F. Wilson, Murrysville Boro; Robert K. Gjertsen, Monroeville, and Harry M. Ferrari, Edgewood Boro, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 26, 1985, Ser. No. 748,855

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—447 **13 Claims**



1. In a fuel assembly for use at non-control rod locations of a nuclear reactor core, said fuel assembly including top and bottom nozzles and a plurality of longitudinal structural members extending between and attached to said nozzles for forming said assembly into an integral unitary structure, at least certain of said structural members including an elongated hollow cladding tube extending between said top and bottom nozzles and means secured to opposite ends of said tube for hermetically sealing said tube and attaching it to said top and bottom nozzles, the improvement which comprises:

(a) a quantity of irradiation-induced creep resistant material disposed within said tube; and

(b) pretensioning means positioned within said tube for applying a predetermined axially-directed compressive load to said creep resistant material therein and reacting said load so as to axially preload said tube in a state of pretension having a magnitude sufficient to substantially counteract an axial load typically transmitted through said unitary structure of said fuel assembly and thereby greatly reduce the compressive stress in said tube of said structural member.

4,684,505

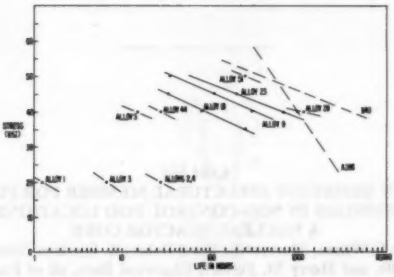
HEAT RESISTANT ALLOYS WITH LOW STRATEGIC ALLOY CONTENT

John R. Brinegar, N. Muskegon, Mich., and William R. Freeman, Easton, Conn., assignors to Howmet Turbine Components Corporation, Greenwich, Conn.

Filed Jun. 11, 1985, Ser. No. 743,485

Int. Cl.[4] C22C *38/06*

U.S. Cl. 420—81 **6 Claims**



6. An iron-aluminum alloy composition consisting essentially of from about 15 to about 22% aluminum; from about 3 to about 12% titanium; from about 3 to about 12% molybdenum; from about 0.1 to about 0.8% hafnium; up to about 0.1% silicon; up to about 0.05% carbon; and the balance iron having excellent oxidation resistance and a stress rupture life of at least 1 hour at 1200° F. and 40,000 psi.

4,684,506

MASTER ALLOY FOR THE PRODUCTION OF TITANIUM-BASED ALLOYS AND METHOD FOR PRODUCING THE MASTER ALLOY

Reinhard Hahn, Schwabach-Limbach, and Hermann Andörfer, Fürth, both of Fed. Rep. of Germany, assignors to GFE Gesellschaft fur Elektrometallurgie mbH, Dusseldorf, Fed. Rep. of Germany

Filed Nov. 6, 1985, Ser. No. 795,611

Int. Cl.[4] C22C *21/00*

U.S. Cl. 420—552 **7 Claims**

1. A master alloy for the production of titanium-based alloys which consists essentially of 25 to 36% by weight molybdenum, 15 to 18% by weight vanadium, at least some and up to about 7% by weight titanium, the balance aluminum, and wherein the molybdenum content is by weight at least 1.4 times the vanadium content and the master alloy has a melting point below 1500° C.

4,684,507

PROCESS OF CORROSION INHIBITION USING COMPOUNDS CONTAINING SULFUR AND AMINO GROUPS

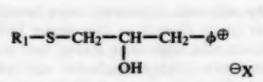
Neil E. S. Thompson, Creve Coeur; Derek Redmore, Webster Groves; Bernardus A. Oude Alink, St. Louis, and Benjamin T. Outlaw, Webster Groves, all of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 320,048, Nov. 10, 1981, Pat. No. 4,393,026, which is a division of Ser. No. 161,198, Jun. 19, 1980, Pat. No. 4,332,967. This application Oct. 29, 1982, Ser. No. 437,722

Int. Cl.[4] C23F *11/04*

U.S. Cl. 422—12 **2 Claims**

1. A process for inhibiting the corrosion of ferrous metals in aqueous acidic or briny media which comprises adding to said media a composition of the formula



where R_1 is a hydrocarbon group, ϕ is a pyridine or substituted pyridine, and X is an anion.

4,684,508

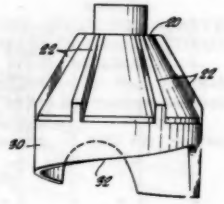
BLOOD HEAT EXCHANGER

Karl M. Sutherland, Westminster, Calif., assignor to American Hospital Supply Corp., Evanston, Ill.

Continuation of Ser. No. 565,236, Dec. 27, 1983, abandoned. This application May 5, 1986, Ser. No. 860,710

Int. Cl.[4] A61M *1/14*; F28D *3/02*; F28F *1/14, 1/36*

U.S. Cl. 422—46 **9 Claims**



1. In a blood oxygenator having an elongated housing, a blood and oxygen mixing area disposed at one end of said housing, a blood inlet means and oxygen inlet means connected to and communicating with said blood and oxygen mixing area, an annular mixing chamber disposed along at least a portion of said housing, and a helical heat exchanger conduit including a plurality of turns disposed in said annular mixing chamber, the improvement comprising:

a mixing plate disposed in said blood and oxygen mixing area and means connected to a lower portion of said mixing plate for directing blood foam downwardly from the mixing plate to said heat exchanger conduit;

wherein said directing means comprises a skirt extending downwardly from said mixing plate and terminating in an edge disposed proximate to said helical heat exchanger conduit, said edge being substantially helical in shape along at least a portion thereof so that said edge of said skirt extends proximate to an uppermost turn of said heat exchanger conduit along a helical portion of such turn.

4,684,509

APPARATUS FOR MEASURING GAS CONCENTRATIONS IN A HOT GAS SAMPLE WITHDRAWN FROM A PROCESS CHAMBER

Tibor Bernath, Distelborn 6, 3000 Hannover 91, Fed. Rep. of Germany

Filed Jul. 16, 1985, Ser. No. 755,515

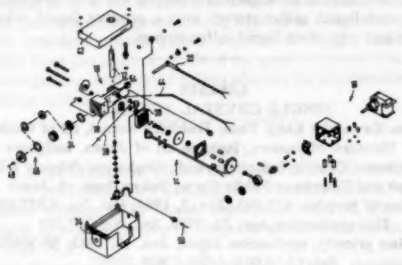
Claims priority, application Fed. Rep. of Germany, Jul. 17, 1984, 3426329

Int. Cl.[4] G01N *30/68*

U.S. Cl. 422—54 **16 Claims**

1. In an apparatus for measuring hydrocarbon concentration in a hot gas sample withdrawn from a process chamber wherein said hot gas is present and for generating an electric monitoring signal in accordance with said concentration, comprising a tempered sampling probe for introduction into a process chamber, a hydrocarbon detector arranged outside of and adjacent a wall of a process chamber, a suction pump having a suction end and a pressure end for withdrawing said gas sample, a thermally insulating casing enclosing said detector and said suction pump, the improvement comprising a tempered solid metal block enclosed in said casing, said solid

metal block housing therein at least said detector and said suction pump and having supply conduits for directing the gas



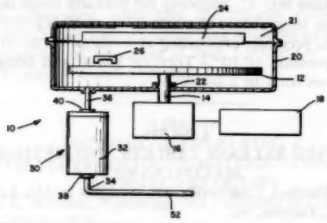
to be measured to said detector from the process chamber, said supply conduits being defined by bores in the metal block.

4,684,510

METHOD AND APPARATUS FOR PREVENTION OF ATMOSPHERIC CORROSION OF ELECTRONIC EQUIPMENT

Carl G. Harkins, Sunnyvale, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 20, 1985, Ser. No. 811,969
Int. Cl.[4] B01J *8/04*; B01D *50/00*
U.S. Cl. 423—210 **23 Claims**



1. A chemical filter for preventing pollutant molecules in the air from contaminating electronic equipment comprising:

(a) a housing having at a first end an inlet means for introducing polluted air into said housing and at a second end a gas outlet means for introducing purified air into said equipment;

(b) a layer of charcoal adjacent said inlet means;

(c) at least one layer of a high surface area metal mesh adjacent said layer of charcoal;

(d) a particle layer between said at least one layer of metal mesh and said outlet means; and

(e) an anti-diffusion tube attached to said gas inlet means, said anti-diffusion tube having a length and diameter to reduce water vapor diffusion into a disk drive electronic unit to no more than about 1 g/yr at 30° C.

4,684,511

PROCESS FOR THE HALOGEN MODIFICATION OF ALUMINOPHOSPHATE MOLECULAR SIEVES AND A PRODUCT SO PRODUCED

Frank P. Gortsema, Pleasantville, and Brent M. T. Lok, New City, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Aug. 29, 1984, Ser. No. 645,214
The portion of the term of this patent subsequent to Feb. 11, 2003, has been disclaimed.
Int. Cl.[4] C01B *15/16*
U.S. Cl. 423—305 **15 Claims**

1. A process for treating crystalline aluminophosphates which comprises contacting at an effective temperature for an effective time to modify their adsorptive and/or catalytic properties said crystalline aluminophosphates a gas mixture comprising:

(i) from 0.1 to 100 volume percent of at least one gas selected from the group consisting of fluorine, chlorine, bromine, iodine, and interhalogen compounds containing two or more halogens;

(ii) from zero to 21 volume percent halogen; and

(iii) from 0 to 99.9 volume percent inert gas.

13. A treated crystalline aluminophosphate characterized as having a framework structure having a chemical composition expressed in terms of mole ratios of oxides as

$$Al_2O_3: 1.0 \pm 0.2\ P_2O_5$$

each of said framework structures being microporous in which the pores are uniform and have nominal diameters within the range of about 3 to about 10 Angstroms, an intracrystalline adsorption capacity for water at 4.6 Torr and 24° C. of at least 3.5 weight percent, the adsorption and desorption of water being completely reversible while retaining the same essential framework topology in both the hydrated and dehydrated state and having present between about 0.5 and about 6 percent by weight halogen.

4,684,512

PHOSPHATE RECOVERY FROM WET PHOSPHORIC ACID PURIFICATION PROCESS

John M. Stewart, Franklin; Teddy R. Clark, Madison, and Thomas E. Edging, Nashville, all of Tenn., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 25, 1986, Ser. No. 900,192
Int. Cl.[4] C01B *25/16*
U.S. Cl. 423—321 R **7 Claims**

1. A process for recovering phosphorus values adhering to the magnesium acid pyrophosphate crystals from wet process superphosphoric acid filtration media comprising suspending the filter media in a sufficient amount of an alkali metal or ammonium salt solution to solubilize free phosphoric acid contained therein and recovering the free acid from the filter cake.

4,684,513

ZONE HEATING FOR FLUIDIZED BED SILANE PYROLYSIS

Sridhar K. Iya, Vancouver, Wash., assignor to Union Carbide Corporation, Danbury, Conn.

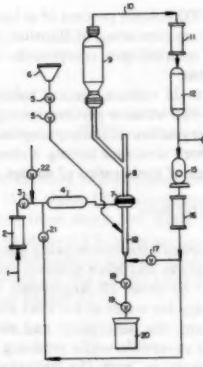
Division of Ser. No. 439,171, Nov. 5, 1982, abandoned. This application Jul. 30, 1985, Ser. No. 760,573
Int. Cl.[4] C01B *33/02*
U.S. Cl. 423—349 **8 Claims**

1. An improved process for the production of polycrystalline silicon in a vertical fluidized bed reactor into which silane feed gas is introduced comprising the steps of:

(a) establishing an upper heating zone in said reactor at a temperature of from about 650° C. to about 800° C. and with at least 70 to 90% of the heat input to the reactor being introduced into the upper heating zone;

(b) maintaining a reaction zone immediately beneath said heating zone with said reaction zone being effectively heated by silicon seed particles descending from said heating zone to form a vertical temperature gradient within the fluidized bed having a temperature at the top of said reaction zone equal to about the temperature of the upper heating zone and having a bed temperature at the base of said reaction zone from about 450° C. to about 650° C. and a horizontal temperature gradient wherein said silicon seed particles at every height throughout said reaction zone are generally hotter than the laterally disposed portion of the reaction zone wall;

(c) cooling a gas distribution zone in said reactor located vertically below said reaction zone such that the temperature in said gas distribution zone is from about 200° C. to about 400° C.;



(d) introducing a stream of silane and/or halosilane-containing feed gas into said gas distribution zone and passing said feed gas into said reaction zone;

(e) decomposing substantially all of said silane and/or halosilane feed gas for deposition onto said silicon seed particles within the reaction zone, which particles being the hottest component of said reaction zone thereby enhancing the heterogeneous formation of silicon on said silicon seed particles and minimizing the deposition of silicon on the internal surfaces of said reactor and the undesirable homogeneous formation of silicon powder within said reactor;

(f) removing the unreacted portion of said gas stream and the gaseous by-products of said silane and/or halosilane decomposition; and

(g) collecting the silicon-coated silicon seed particles whereby silicon is obtained continuously or semicontinuously as low-cost, high purity polycrystalline silicon.

4,684,514

HIGH PRESSURE PROCESS FOR SULFUR RECOVERY FROM A HYDROGEN SULFIDE CONTAINING GAS STREAM

Michael S. Chen, Zionsville, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jul. 22, 1985, Ser. No. 757,571

Int. Cl.[4] C01B *17/02*

U.S. Cl. 423—574 R **17 Claims**

1. A process for recovering elemental sulfur from a gas containing hydrogen sulfide comprising combusting the gas containing hydrogen sulfide in a furnace with a oxygen-containing gas to provide hydrogen sulfide and sulfur dioxide followed by the reaction of the hydrogen sulfide and sulfur dioxide forming a gaseous stream comprising water vapor, sulfur vapor, and other acid gas components, cooling and dividing the formed gaseous stream into a combined liquid water and liquid sulfur stream and a remaining process gas stream substantially free of water at a pressure greater than 50 psia such that water and sulfur are condensed concurrently and at a temperature above the sulfur melting point of approximately 248° F., and subsequently separatig the combined liquid water and liquid sulfur stream into a product liquid water stream and a product liquid sulfur stream.

4,684,515

SINGLE CRYSTAL ARTICLE

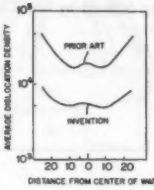
Akihisa Kawasaki; Kohji Tada; Toshihiro Kotani, all of Osaka, and Shintaro Miyazawa, Isehara, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Nippon Telegraph and Telephone Public Corp., Tokyo, both of, Japan

Division of Ser. No. 617,563, Jun. 5, 1984, Pat. No. 4,537,652. This application Apr. 24, 1985, Ser. No. 727,391

Claims priority, application Japan, Jun. 10, 1983, 58-104732

Int. Cl.[4] C01F *1/00*; C30B *29/40*

U.S. Cl. 423—495 **2 Claims**



1. A single crystal of a compound consisting of atoms of the groups III–V or of atoms of the groups II–IV of the periodic table and having a dislocation density of 1.5×10^4 cm^{-2} or less, said crystal being prepared by a process comprising pulling up a single crystal by the Czochralski process and cooling it at a temperature not lower than 600° C. in vacuo wherein the cooling step of the pulled single crystal comprises lowering the temperature at a rate of up to 5° C./min. to a temperature higher than 600° C. while maintaining the same pressure, keeping the same temperature for 1 to 2 hours, reducing the pressure while maintaining the same temperature at a rate of up to 60 Kg/cm^2/hr. to 1 to 3 Kg/cm^2, keeping the same pressure for 1 to 2 hours, lowering the temperature while maintaining the same pressure at a rate of up to 5° C./min. to a temperature not lower than 600° C., reducing the pressure while maintaining the same temperature at a rate of up to 60 Kg/cm^2/hr. to atmospheric pressure, evacuating at a rate of up to 10 Torr/-min. to a pressure of 10^{-2} Torr. or lower, and keeping the same vacuum for 1 to 2 hours.

4,684,516

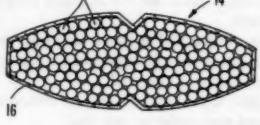
SUSTAINED RELEASE TABLETS AND METHOD OF MAKING SAME

Baldev R. Bhutani, Libertyville, Ill., assignor to Alra Laboratories, Inc., Gurnee, Ill.

Continuation-in-part of Ser. No. 518,923, Aug. 1, 1983, abandoned. This application May 17, 1985, Ser. No. 735,046

Int. Cl.[4] A61J *3/02*

U.S. Cl. 424—19 **20 Claims**



1. In a dense, compressed pharmaceutical tablet for oral administration which is characterized by the ability to disinte-

grate quickly and spontaneously into coated pellets which release medicament at a controlled rate over a period of several hours in the gastrointestinal tract, the improvement consisting essentially of a first coating of a retarding material adapted to slow the release rate of said medicament, a second thin, uniform disintegrant coating applied in a dry state on the said retardant coated pellets capable of rapidly absorbing water from the aqueous fluids of the gastrointestinal tract and disintegrating, said coated pellets adapted for compression into a dense tablet.

4,684,517

MOUTHRINSE COMPOSITION CONTAINING HYDROGEN PEROXIDE AND FLUORIDE

Donald Clipper, Belle Mead, and James Norfleet, Plainfield, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 697,614, Feb. 4, 1985, abandoned, which is a continuation-in-part of Ser. No. 579,835, Feb. 13, 1984, Pat. No. 4,537,778, which is a continuation-in-part of Ser. No. 455,388, Jan. 3, 1983, Pat. No. 4,431,631. This application Sep. 30, 1986, Ser. No. 913,584

Int. Cl.[4] A61K *7/18, 7/20, 33/16*

U.S. Cl. 424—52 **19 Claims**

1. An aqueous storage-stable mouthwash composition comprising: from about 0.5 to about 5% by weight of hydrogen peroxide, and from about 0.01 to about 2% by weight of a compound providing fluoride or fluoride-containing ions in the aqueous composition.

4,684,518

ORAL COMPOSITIONS

John J. Parran, Jr., Cincinnati, and Nabil Y. Sakkab, Loveland, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 702,708, Feb. 19, 1985, Pat. No. 4,590,066, which is a continuation of Ser. No. 591,228, Mar. 19, 1984, Pat. No. 4,515,772, which is a continuation of Ser. No. 391,040, Jun. 22, 1982, abandoned. This application Mar. 12, 1986, Ser. No. 839,111

The portion of the term of this patent subsequent to May 7, 2002, has been disclaimed.

Int. Cl.[4] A61K *7/16, 7/18*

U.S. Cl. 424—52 **5 Claims**

1. A process for reducing the incidence of calculus on dental enamel comprising contacting the enamel surfaces in the mouth with a composition comprising a soluble pyrophosphate source capable of providing at least 1.5% $P_2O_7^{-4}$ and from about 50 ppm to about 3500 ppm F.

4,684,519

METHOD OF PREPARING A POLYVINYLPYRROLIDONE-HALOGEN COMPLEX OF IMPROVED STABILITY

Eugene S. Barabas, Watchung, N.J., assignor to GAF Corporation, Wayne, N.J.

Filed Apr. 9, 1986, Ser. No. 849,918

Int. Cl.[4] A61K *31/79*

U.S. Cl. 424—80 **7 Claims**

1. A homogeneous liquid phase process for preparing polyvinylpyrrolidonehalogen complexes of improved stability which comprises the steps:

(a) dissolving a vinylpyrrolidone polymer having a K value between about 12 and about 100 in about 3 to about 9 percent by weight water;

(b) dissolving halogen containing from 0% to 35% inorganic halide in an alcohol wherein the concentration of alcohol is at least 40% by weight of the combined (a) and (b) solutions;

(c) mixing and reacting the solutions of steps (a) and (b) at a temperature not in excess of 95° C. for a period of from about 1 to about 8 hours to form the polyvinylpyrrolidone-iodine complex simultaneously with an alcohol-water azeotrope;

(d) removing the alcohol/water azeotrope while maintaining solids in the distilland below 40% by distillation and recycling distillate to step (b) and

(e) drying the remaining product solution containing less than 40% solids from the distillation zone to provide a uniformly colored, particulate product of improved stability.

4,684,520

PHARMACEUTICAL COMPOSITIONS HAVING CEREBRAL ANTIANOXIC AND METABOLIC ACTIVITIES

Alberto Bertelli, Milan, Italy, assignor to Seuref A.G., Vaduz, Liechtenstein

Filed Apr. 2, 1985, Ser. No. 718,884

Claims priority, application Switzerland, Apr. 9, 1984, 1774/84

Int. Cl.[4] A61K *37/48, 31/685*

U.S. Cl. 424—94.10 **4 Claims**

1. A pharmaceutical composition for exhibiting cerebral antianoxic activity consisting of component (a) which is Coenzyme Q_{10} and component (b) which is a mixture of phosphatidylcholine, phosphatidylserine, phosphatidylethanolamine, phosphatidylinositol and sphingomyelin or soy lecithin in a 1:5 ratio of said component (a) to component (b) and excipients.

4,684,521

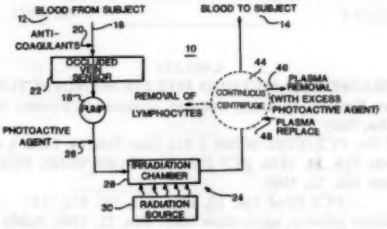
METHOD AND SYSTEM FOR EXTERNALLY TREATING THE BLOOD

Richard L. Edelson, 3 Rall Ct., Roseland, N.J. 07068, assignor to Frederic A. Bourke, Jr.; Eleanor F. Bourke and Richard L. Edelson, all of East Norwalk, Conn.

Division of Ser. No. 447,891, Dec. 8, 1982, Pat. No. 4,612,007, which is a continuation-in-part of Ser. No. 274,319, Jun. 16, 1981, Pat. No. 4,428,744, and Ser. No. 272,981, Jun. 12, 1981, Pat. No. 4,398,906, which is a continuation-in-part of Ser. No. 102,553, Dec. 11, 1979, Pat. No. 4,321,919, said Ser. No. 274,319, is a continuation-in-part of Ser. No. 102,553,. This application Jun. 21, 1985, Ser. No. 747,407

Int. Cl.[4] A61K *35/14*

U.S. Cl. 424—101 **13 Claims**



1. A chemical agent useful for reducing the population of a selected blood constituent having receptor sites, which comprises:

a carrier having strong affinity for the receptor sites on or in the selected blood constituents;

a photoactive agent physically incorporated within or chemically bound to the carrier moiety, which interferes with the metabolism of the selected blood constituent when activated with UV radiation.

4,684,522

SLENDERIZING AND ANTI-CELLULITIS COSMETIC COMPOSITION BASED ON AN EXTRACT OF A PLANT CONTAINING SAPONINS, AN EXTRACT OF ARNICA MONTANA L AND A KOLA NUT EXTRACT, AND TO A PROCESS FOR USING THE SAME

Jeanine Marissal, Monte Carlo, Monaco, and Lucien P. Aubert, Cap D'Ail, France, assignors to Société Anonyme dite: BIO-THERM, Monaco, Monaco

Continuation-in-part of Ser. No. 347,021, Feb. 8, 1982, abandoned. This application Mar. 14, 1985, Ser. No. 711,760

Int. Cl.[4] A61K *35/78*

U.S. Cl. 424—195.1 8 Claims

1. A cosmetic composition for application to the skin, said composition having slenderizing and anti-cellulitis activity and containing:

(i) an effective amount of a plant extract containing saponins, said extract being selected from the group consisting of

(a) an extract of the leaves of *Hedera haelix* L obtained (1) from a lixiviation extraction with water, or (2) from an extraction operation consisting in extracting undesirable products with a solvent selected from the group consisting of an aliphatic ketone, an ether, an aromatic hydrocarbon and a chlorinated lower alkane, followed by an extraction with an alcohol, or (3) from an alcohol extraction follows by concentration of the resulting extract and dispersion of the resulitng concentrated extract in a mixture of water and a water immiscibie organic solvent and concentration of the water phase;

(b) an extract of rhizomes of *Ruscus aculeatus* L obtained from a hydroalcoholic extraction wherein the alchol has 3–6 carbon atoms, followed by evaporation of the extract, taking up the residue in methanol, precipitating the saponins with a mixture of ehter and acetone, taking up the precipitate with water an extracting the water solution with ether;

(c) an extract of *Aesculus hipocastanus* L, said extract being a glycolic extract, a dry hydroalcoholic extract, or a fluid or soft extract according to U.S. Pharmacopeia; and

(d) a mixture containing two or more of (a), (b) and (c), said extracts (a), (b) and (c) containing from 30 to 100 percent sponins,

(ii) an effective amount of an extract of the flowers of Arnica Montana L, said extract being obtained as a tincture according to U.S. Pharmacopeia or as a glycol extract; and

(iii) an effective amount of an extract of kola nut obtained (1) as a hydroalcoholic extract or (2) as a fluid extract, a tincture or a wine of kola according to U.S. Pharmacopeia, said extract of kola nut containing caffeine in an amount ranging from 1.25 to 10 weight percent.

4,684,523

DRAGéE AND METHOD FOR ITS MANUFACTURE

Pietro Ferrero, Brussels, Belgium, assignor to Ferrero S.p.A., Alba, Italy

PCT No. PCT/EP85/00284, § 371 Date Feb. 14, 1986, § 102(e) Date Feb. 14, 1986, PCT Pub. No. WO86/00226, PCT Pub. Date Jan. 16, 1986

PCT Filed Jun. 14, 1985, Ser. No. 832,714

Claims priority, application Italy, Jun. 21, 1984, 86003 A/84

Int. Cl.[4] A61K *9/36;* A23G *3/30*

U.S. Cl. 424—441 9 Claims

1. A dragée comprising a core covered by a shell adhering to the core, said shell being obtained by spraying a sorbitol-based aqueous syrup on said core while tumbling said core in an enrober, characterized in that the shell comprises a plurality of layers consisting essentially of sorbitol and of the methyl ester of L-aspartyl-L-phenyl-alanine (aspartame), the latter being present in a proportion of no more than 0.02 to 0.3% by weight of anhydrous sorbitol in said shell.

4,684,524

RATE CONTROLLED DISPENSER FOR ADMINISTERING BENEFICIAL AGENT

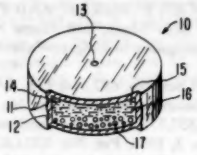
James B. Eckenhoff, Los Altos; Richard Cortese, Los Gatos, and Felix A. Landrau, Milpitas, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 590,778, Mar. 19, 1984, Pat. No. 4,595,583. This application Aug. 8, 1985, Ser. No. 763,493

The portion of the term of this patent subsequent to Jun. 17, 2003, has been disclaimed.

Int. Cl.[4] A61K *9/22;* A61M *31/00*

U.S. Cl. 424—469 40 Claims



1. A dispenser for delivering avermectin to an environment of use, the dispenser comprising:

(a) wall means for surrounding and forming a compartment, which compartment comprises;

(1) lipophilic means for absorbing thermal energy from the enviroment of use;

(2) a beneficially effective amount of avermectin present in the means for absorbing thermal energy;

(3) osmotically active means for mixing with an aqueous fluid present in the environment of use that enters the compartment for increasing the aqueous solution volume in the compartment; and,

(b) means in the wall for delivering avermectin from the dispenser to the environment of use over time.

4,684,525

METHOD FOR MAKING BEER

Hermann Plainer, Reinheim; Bruno Sproessler, and Helmut Uhlig, both of Rossdorf, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Aug. 14, 1986, Ser. No. 896,856

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1985, 3530009

Int. Cl.[4] C12C *11/04*

U.S. Cl. 426—16 8 Claims

1. A method for making a low calorie beer which comprises adding to a wort from 2 to 200 glucamylase units, per liter of wort, of an amyloglucosidase from a Rhizopus culture, said amyloglucosidase having a protease content therein and having been heated above 30° C. at a pH greater than 6 until the ratio of amyloglucosidase to protease therein is greater than one glucamylase unit per protease unit, fermenting said wort with yeast to produce beer whereby the carbohydrate content of said wort is reduced, and, after the carbohydrate content has been reduced to less than 2 percent, inactivating the amyloglucosidase under pasteurizing conditions by heating at 60° C. to 75° C. for five seconds to one hour.

4,684,526

ANTISTALING/CONDITIONING AGENT IN PRODUCING BAKERY PRODUCTS

William H. Knightly, 146 Devonshire Rd., Wilmington, Del. 19803

Filed Dec. 21, 1984, Ser. No. 685,155

Int. Cl.[4] A21D *2/08;* A23J *7/00*

U.S. Cl. 426—19 11 Claims

1. In a method of preparing a baked food product by mixing ingredients comprising flour, water, a leavening agent, and an

antistaling/conditioning agent, and then baking the mixed ingredients,

the improvement comprising said antistaling/conditioning agent consisting essentially of a blend of

(i) 90 to 10 parts by weight of the blend of a hydrophillic fraction of naturally occurring lecithins having an HLB value of at least about 8, and

(ii) 10 to 90 parts by weight of the blend of at least one of a monoglyceride, lactic acid esterified monoglyceride, succinic acid esterified monoglyceride, maleic acid esterified monoglyceride or edible salts of stearyl lactylic acid.

4,684,527

PROCESS FOR PRODUCING SEASONING

Hiroshi Motai; Yaichi Fukushima, both of Noda, and Takashi Ishiyama, Saitama, all of Japan, assignors to Kikkoman Corporation, Noda, Japan

Filed Apr. 1, 1986, Ser. No. 846,631
Int. Cl.[4] A23L *1/20, 1/221*
U.S. Cl. 426—46 **3 Claims**

1. A process for producing a seasoning which comprises contacting at a temperature of 20° to 60° C. and for a time of 5 minutes to 24 hours a hydrolyzate of soy sauce koji prepared from soy sauce raw materials, in a liquid state at a pH of 2.5 to 8.0, with an immobilized glutaminase or with an immobilized peptidase and immobilized glutaminase in the presence of sodium chloride at a concentration of 3 to 20% (W/V).

4,684,528

FLAVOR OF ZINC SUPPLEMENTS FOR ORAL USE

John C. Godfrey, White Plains, N.Y., assignor to Godfrey Science & Design, Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 619,079, Jun. 11, 1984, abandoned. This application Jun. 10, 1985, Ser. No. 756,070
Int. Cl.[4] A23L *1/304, 1/305;* A23G *3/00*
U.S. Cl. 426—74 **13 Claims**

1. A slow-release candy composition for oral consumption comprising a hard candy base material and uniformly contained in said hard candy base material a zinc compound and an amino acid, said amino acid being capable of forming a complex with said zinc compound and being capable of forming a complex with said zinc compound and being selected from the group consisting of glycine, L-alanine, D,L-alanine, L-2-aminobutyric acid, D,L-2-aminobutyric acid, L-valine, D,L-valine, L-isovaline, D,L-isovaline, L-leucine, D,L-leucine, D-isoleucine, D,L-isoleucine, L-lysine, and D,L-lysine; said composition containing from about 1 mg to about 5 mg of zinc for each gram of said composition, and the molar ratio of said amino acid to zinc being from about 2 to 20; whereby said zinc is slowly and uniformly released as said composition is being orally consumed.

4,684,529

PROCESS FOR THE PREPARATION OF IODIZABLE CALCIUM COMPOSITION

Toshio Ueno, Higashiyamato, Japan, assignor to Kabushiki Kaisha Fuji Kikaku, Tokyo, Japan

Filed Mar. 11, 1985, Ser. No. 710,200
Claims priority, application Japan, Mar. 9, 1984, 59-43813
Int. Cl.[4] A23L *3/32*
U.S. Cl. 426—237 **12 Claims**

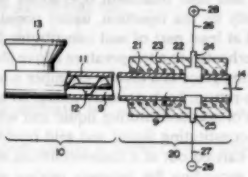
1. A process for the preparation of ionizable calcium composition powder, which comprises the following steps:

(a) grinding oyster shells to obtain raw material powder,

(b) continuously and forcibly feeding said raw material powder into a tubular member,

(c) heating said raw material powder to a temperature from 500° C. to 1,200° C., in said tubular member,

(d) applying a voltage to said raw material powder heated at said temperature in said tubular member such that decomposition of said raw material powder in said tubular member is substantially accelerated by passing electricity through said raw material powder, and



(e) continuously removing ionizable calcium composition powder from said tubular member as said heating step and said application of voltage step are continuously applied to said raw material powder.

4,684,530

ADSORPTION OF PROTEINS FROM FLUIDS

William A. Welsh, Fulton; Yves O. Parent, Sykesville, and Stanley A. Mertz, Eldersburg, all of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Oct. 4, 1985, Ser. No. 784,010
Int. Cl.[4] C12H *1/04;* A23L *2/30*
U.S. Cl. 426—330.4 **19 Claims**

1. A method for removing protein from wine or fruit juice comprising:

(a) contacting said wine or fruit juice with an activated silica-alumina cogel, wherein the surface H_o of said cogel is less than the pH of said wine or fruit juice, and said pH is less than the isoelectric point of the protein to be removed from the wine or fruit juice, said cogel having pores of sufficient diameter to permit the diffusion and adsorption of protein molecules,

(b) allowing protein to be adsorbed onto said cogel, and

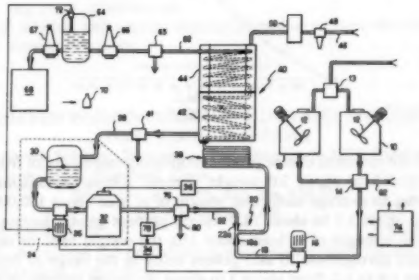
(c) separating said cogel from the protein-depleted wine or fruit juice.

4,684,531

PROCESS FOR THE PREPARATION AND HEAT TREATMENT OF FOOD PRODUCTS

Roland Torterotot, Le Plessis Mornay, 78730 Longvilliers, France

Division of Ser. No. 588,524, Mar. 12, 1984, Pat. No. 4,583,453. This application Jul. 19, 1985, Ser. No. 756,732
Claims priority, application France, Mar. 29, 1983, 83 05149
Int. Cl.[4] A23B *7/00;* A23L *3/00*
U.S. Cl. 426—399 **8 Claims**



1. A process for the continuous preparation of a liquid or jelled food product containing a fraction of constituting liquid and a fraction of concentrate containing the basic ingredients of said food product, said process comprising the steps of

mixing of an appropriate volume of said constituting liquid with an appropriate volume of said concentrate and heat treating the mixture for preserving a reconstituted food product, said mixing and heat treatment operations being carried out simultaneously by the injection, under pressure, of said concentrate and at least part of said constituting liquid while said liquid is superheated to a temperature above about 100° C., said injection taking place in a tubular chamber which is closed and includes non-return, back pressure means so as to prevent any vaporization of said constituting liquid and wherein said injection of said constituting liquid and said injection of said concentrate are carried out in a countercurrent manner with said concentrate ascending for intimate mixing while heat treatment takes place.

4,684,532

AQUEOUS BUTTER FLAVORED COMPOSITION, PREPARATION AND USE

Henry J. Izzo, Bridgewater, N.J., assignor to Lever Brothers Company, New York, N.Y.

Filed Apr. 29, 1986, Ser. No. 857,208

Int. Cl.[4] A23D *3/00;* **A23L** *1/09, 1/226*

U.S. Cl. 426—533 **12 Claims**

1. A method for preparing a cooked butter flavor comprising the steps of:

(i) heating an admixture of an aqueous solution of sugar and butter in a ratio of sugar to butter of 50:1 to 1:10 at a temperature of about 150° F. to 250° F. for about 0.5 to 5 hours resulting in formation of an oil in sugar water emulsion; and

(ii) separating a fatty phase from the emulsion and recovering an aqueous phase, said aqueous phase having a buttery flavor.

4,684,533

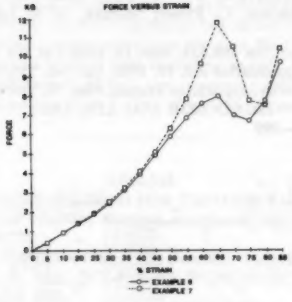
IMITATION CHEESE PRODUCTS

John F. Kratochvil, Oak Brook, Ill., assignor to Kraft, Inc., Glenview, Ill.

Filed Oct. 9, 1984, Ser. No. 658,618

Int. Cl.[4] A23D *5/00;* **A23L** *1/04;* **A23C** *20/02*

U.S. Cl. 426—575 **7 Claims**



1. An imitation cheese product consisting essentially of from about 0.5 to about 3.0 weight percent Kappa carrageenan having an average molecular weight of at least about 100,000, from about 1.5 to about 12.0 weight percent gelatin having a bloom strength of at least about 150, the weight ratio of said Kappa carrageenan to said gelatin being in the range of from about 1:6 to 1:1, from about 3 to about 30 weight percent of an edible fat, and from about 40 to about 65 weight percent of water, based on the total weight of said imitation cheese composition, said carrageenan and said gelatin being present in a structurally firm continuous carrageenan-gelatin phase at refrigeration temperature having a pH in the range of from about 4.7 to about 6.0 and said fat being homogeneously dispersed in said continuous carrageenan-gelatin phase.

4,684,534

QUICK-LIQUIFYING, CHEWABLE TABLET

William Valentine, Rocky Hill, Conn., assignor to Dynagram Corporation of America, Lawrenceville, Ga.

Filed Feb. 19, 1985, Ser. No. 702,818

Int. Cl.[4] A61K *9/00, 15/00, 21/00*

U.S. Cl. 427—3 **64 Claims**

1. A tablet comprising an agglomerate, said agglomerate comprising at least about 25% by weight of a carbohydrate-based material including a water-soluble binder, and an active ingredient dispersed in the agglomerate, said carbohydrate-based material comprising from about 1% to about 10% binder by weight, said tablet having an outer surface and an interior, said tablet at said outer surface being harder than in said interior, said tablet being compressed to a hardness sufficient to form a mechanically stable tablet harder at said outer surface, said hardness and the particle size of said carbohydrate based material and of said active ingredient being such as to provide an interior which is rapidly liquifiable into a smooth liquid without perceivable grit when said tablet is masticated and the tablet is broken into pieces and the tablet interior is contacted with saliva.

4,684,535

SURFACE TREATMENT OF PLASTICS MATERIAL

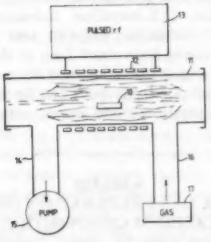
Rudolf A. H. Heinecke; Suresh M. Ojha, and Ian P. Llewellyn, all of Harlow, United Kingdom, assignors to Standard Telephones & Cables, London, England

Continuation of Ser. No. 706,791, Feb. 28, 1985, abandoned. This application Jul. 28, 1986, Ser. No. 890,891

Claims priority, application United Kingdom, Mar. 3, 1984, 8405648

Int. Cl.[4] B05D *3/02, 3/06*

U.S. Cl. 427—38 **10 Claims**



1. A process for removing discontinuities from a plastics surface by fusion and cross-linking of the surface, the process comprising the steps of:

exposing the plastics surfaces to a first pulsed radio frequency plasma comprising argon as the major constituent and up to 30 volume percent of hydrogen, the hydrogen content of the plasma being such that the melting point of the plastics surface is reduced whereby the plastics surface is rendered molten and thereby smoothed and exposed the molten plastics surface to a second pulsed radio frequency plasma comprising argon for a sufficient period of time to effect cross-linking of the molten surface, thereby increasing the melting point of the surface.

4,684,536
HARD LAYER FORMED BY INCORPORATING NITROGEN INTO MO OR W METAL AND METHOD FOR OBTAINING THIS LAYER

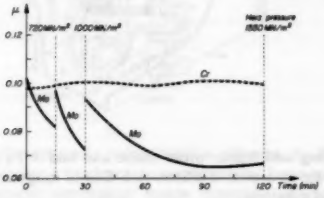
Bogdan Zega, Geneva, Switzerland, assignor to Battelle Development Corporation, Columbus, Ohio

Filed Dec. 6, 1984, Ser. No. 681,856

Claims priority, application Switzerland, Apr. 18, 1983, 2058/83

Int. Cl.⁴ C23C *15/00*

U.S. Cl. 427—47 **5 Claims**



1. A method for obtaining a ductile, polycrystalline, cubic-centered Mo or W coating comprising magnetron cathode sputtering a Mo or W target onto a substrate in the presence of a nitrogen atmosphere such that a solid solution of Mo or W plus nitrogen is formed on the substrate, the nitrogen not exceeding 2% by weight of the coating.

4,684,537
PROCESS FOR THE SENSITIZATION OF AN OXIDATION/REDUCTION PHOTOCATALYST, AND PHOTOCATALYST THUS OBTAINED

Michael Graetzel; Nick Serpone, and Dung Duonghong, all of Lausanne, Switzerland, assignors to R. E. Stiftung, Zürich, Switzerland

PCT No. PCT/CH85/00066, § 371 Date Dec. 27, 1985, § 102(e) Date Dec. 27, 1985, PCT Pub. No. WO85/05119, PCT Pub. Date Nov. 21, 1985

PCT Filed Apr. 30, 1985, Ser. No. 824,694

Claims priority, application Switzerland, Apr. 30, 1984, 2113/84

Int. Cl.⁴ B05D *3/06*

U.S. Cl. 427—53.1 **8 Claims**

1. A process for the sensitization of a titanium oxide-based oxidation/reduction photocatalyst, which comprises chemically bonding to its surface a chromophore consisting of a fragment of a complex of a transition metal with a ligand of the bipyridyl or phenanthrolyl type, causing the light absorption band of the catalyst to shift into the visible region.

4,684,538
POLYSILOXANE URETHANE COMPOUNDS AND ADHESIVE COMPOSITIONS, AND METHOD OF MAKING AND USING THE SAME

Philip T. Klemarczyk, Collinsville, Conn., assignor to Loctite Corporation, Newington, Conn.

Filed Feb. 21, 1986, Ser. No. 831,785

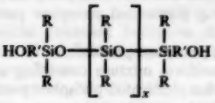
Int. Cl.⁴ B05D *3/06*

U.S. Cl. 427—54.1 **6 Claims**

1. A method of bonding a first surface formed of polyethylene, to a second surface, comprising:

(1) applying to at least one of said first and second surfaces a composition comprising a polymerizable polysiloxane urethane compound formed as a reaction product of:

(a) a polysiloxane carbinol having a molecular weight of from about 5,000 to about 50,000, of the formula



wherein:

each R independently is C_1–C_8 alkyl, C_3–C_6 cycloalkyl, or phenyl;

each R' independently is linear C_4–C_{20} alkylene; and

x = 50–700;

(b) a polyisocyanate; and

(c) a polyfunctional compound having at least one functional group which is reactive with an isocyanate group of said polyisocyanate and after reaction therewith provides an ethylenic functional group in the reaction product;

(2) placing the first and second surfaces in bondable relationship to one another in a curing zone;

(3) establishing vacuum in said curing zone;

(4) breaking said vacuum with a gas consisting essentially of nitrogen, to provide a gas environment thereof in said curing zone; and

(5) exposing said composition to elevated temperature and/or actinic radiation for sufficient time to cure same in said gas environment in said curing zone, thereby bonding said first and second surfaces to one another.

4,684,539
PROCESS FOR PRODUCING COATED EUROPIUM ACTIVATED STRONTIUM BORATE PHOSPHORS

Charles F. Chenot, Towanda; Leslie F. Gray, Sayre, both of Pa., and Michael A. Krebs, Waverly, N.Y., assignors to GTE Products Corporation, Stamford, Conn.

Filed Aug. 4, 1986, Ser. No. 892,236

Int. Cl.⁴ B05D *5/06*

U.S. Cl. 427—64 **7 Claims**

1. A process for producing a europium activated strentium borate phosphor having a strontium containing coating, said process comprising:

(a) washing a europium activated strontium borate phosphor with a solution of strontium hydroxide to produce a first washed phosphor;

(b) removing the first washed phosphor from the resulting wash solution;

(c) washing said first washed phosphor with a wash solution selected from the group consisting of ammonium fluoride in alcohol, ammonium bifluoride in alcohol, and a strontium salt dissolved in ammonium hydroxide, to produce a second washed phosphor;

(d) removing the second washed phosphor from the resulting wash solution; and

(e) heating said second washed phosphor to form the final coated phosphor.

4,684,540
COATED PIGMENTED PHOSPHORS AND PROCESS FOR PRODUCING SAME

Harry O. Schulze, Wyalusing, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Jan. 31, 1986, Ser. No. 824,760

Int. Cl.⁴ B05D *5/06*

U.S. Cl. 427—71 **9 Claims**

1. A process for producing a pigmented coated phosphor, said process comprising:

(a) deagglomerating a pigment;

(b) preparing a relatively uniform aqueous mixture of particles of a phosphor, particles of the pigment, and a free flowing agent;

(c) adding a precipitating agent to said mixture in an amount

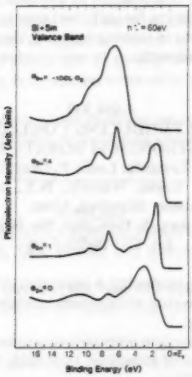
sufficient to cause said free flowing agent and said pigment to coprecipitate upon and coat said phosphor;
(d) separating the resulting pigmented phosphor particles from the resulting liquor;
(e) drying said pigmented phosphor particles;
(f) forming a relatively uniform mixture consisting essentially of the resulting dried pigmented phosphor particles, a source of a water soluble silicate, and water, with the amount of water being sufficient only to allow the silicate to coat the surface of said phosphor particles and form a moist powder;
(g) heating the resulting mixture of pigmented phosphor particles and silicate at a sufficient temperature for a sufficient time with sufficient agitation to produce the final nonagglomerated silicate coated pigmented phosphor.

4,684,541

SAMARIUM-PROMOTED OXIDATION OF SILICON AND GALLIUM ARSENIDE SURFACES

Alfonso Franciosi, Eden Prairie, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Jun. 11, 1986, Ser. No. 872,889
Int. Cl.[4] B05D *5/12*
U.S. Cl. 437—173 **5 Claims**



1. A method for promoting oxidation of a silicon or gallium arsenide surface comprising: depositing a samarium overlayer 2–25 Å in thickness, which comprises trivalent samarium on said silicon or gallium arsenide surface prior to the oxidation of said surface oxidizing said surface.

4,684,542

LOW PRESSURE CHEMICAL VAPOR DEPOSITION OF TUNGSTEN SILICIDE

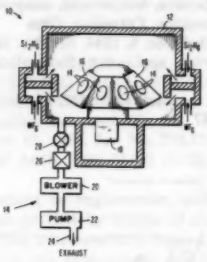
Joseph M. Jasinski, Pleasantville; Bernard S. Meyerson, Yorktown Heights, and Bruce A. Scott, Pleasantville, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 11, 1986, Ser. No. 895,119
Int. Cl.[4] H01L *21/285*
U.S. Cl. 437—245 **8 Claims**

1. A method for depositing silicon-rich tungsten silicide films on a substrate, said method including the steps of:
introducing WF_6 gas and a higher order silane gas given by the formula

$$Si_nH_{2n+2},$$

where n=2, 3, . . . into a cold wall, hot susceptor CVD reactor with the substrate located on said susceptor,
establishing a substrate temperature less than about 370° C. and a total system pressure less than 1 Torr, the flow rate of said WF_6 being less than about 25 sccm while the flow rate of said higher order silane is less than about 500 sccm, and



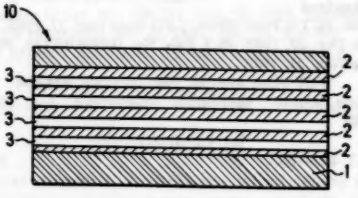
reacting said higher order silane and said WF_6 at said substrate to deposit a silicon-rich film of tungsten silicide on said substrate.

4,684,543

STARTING MIXTURE FOR AN INSULATING COMPOSITION COMPRISING A LEAD GLASS, SILK-SCREENING INK COMPRISING SUCH A MIXTURE, AND THE USE OF SAID INK FOR THE PROTECTION OF HYBRID MICROCIRCUITS ON CERAMIC SUBSTRATES

Hugues Baudry, Varennes-Jarcy, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 17, 1985, Ser. No. 745,734
Claims priority, application France, Jun. 22, 1984, 84 09809
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—96 **12 Claims**



1. A starting mixture for an insulating composition comprising on the one hand a vitreous phase formed from alumina (Al_2O_3), silica (SiO_2), boric oxide (B_2O_3) and including a lead monoxide (PbO), and comprising on the other hand one or several lead oxides having a degree of oxidation higher than or equal to two in powderform, characterized in that the vitreous phase includes in addition zinc oxide (ZnO), calcium oxide (CaO) and copper oxide (CuO) and in that said vitreous phase represents 70 to 80% of the mixture said mixture containing a second phase consisting of PbO_2 and constituting 30% to 20% by volume of the mixture.

4,684,544

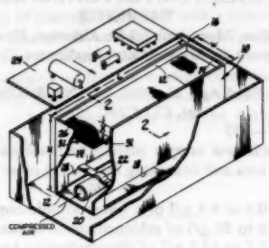
SOLDER FLUXING METHOD AND APPARATUS

Richard K. Arnett, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 19, 1986, Ser. No. 830,727
Int. Cl.[4] H05K *3/22*
U.S. Cl. 427—96 **13 Claims**

1. Improved apparatus for applying soldering flux to the face of a printed circuit board or the like, and of the type including the combination of an upstanding flue over which the face of

said board may be positioned to be contacted with flux, a supply of liquid flux within said flue, and means for generating an ascending foam of flux bubbles which rise upwardly through the top of said flue and into contact with the face of



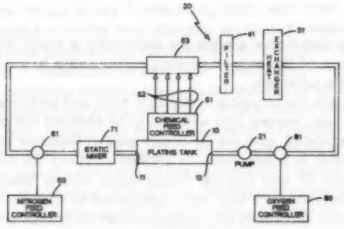
said board, the upwardly rising bubbles adjacent the face of said board having a tendency to combine into large bubbles, the improvement comprising: means extending substantially across said flue and adjacent said flue top for converting said larger bubbles into smaller bubbles.

4,684,545

ELECTROLESS PLATING WITH BI-LEVEL CONTROL OF DISSOLVED OXYGEN

Edmond O. Fey, Vestal, N.Y.; Peter Haselbauer, Dettenhausen, Fed. Rep. of Germany; Dae Y. Jung, Endwell; Ronald A. Kaschak, Vestal, both of N.Y.; Hans-Dieter Kilthau, Rottenburg-Baisingen, Fed. Rep. of Germany; Roy H. Magnuson, Binghamton, and Robert J. Wagner, Vestal, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 10, 1986, Ser. No. 827,427
Int. Cl.[4] C23C *18/40*
U.S. Cl. 427—98 **8 Claims**



1. A method of minimizing the nodules produced by a continuous electroless copper plating system which has a plating solution in a plating tank and in external piping and wherein the oxygen level in the plating tank is maintained at a first value such that plating takes place comprising the steps of:

adding oxygen at the point the plating solution enters the external piping so that no plating takes place in the external piping;

adjusting the oxygen value in the plating solution to said first value prior to the point the plating solution goes from said external piping to said plating tank; and

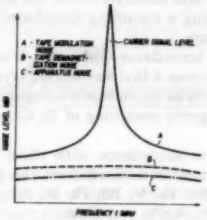
recirculating the plating solution between said plating tank and said external piping.

4,684,546

METHOD OF MAKING A MAGNETIC RECORDING MEDIUM

Yasumichi Tokuoka; Yoshisuke Yamakawa, and Akio Watanabe, all of Tokyo, Japan, assignors to TDK Corporation, Tokyo, Japan

Division of Ser. No. 617,535, Jun. 5, 1984. This application Nov. 14, 1986, Ser. No. 930,512
Claims priority, application Japan, Jun. 10, 1983, 58-102784
Int. Cl.[4] H01F *10/02*
U.S. Cl. 427—130 **4 Claims**



1. A method for fabricating a magnetic recording medium which comprises steps of:

(a) applying a magnetic paint containing therein ferromagnetic metal powder onto a base film;

(b) subjecting the surface of said magnetic paint coating to a surface smoothing process; and

(c) curing said magnetic coating,

said surface smoothing process being carried out in such a manner that the surface roughness of said magnetic coating, i.e., the surface roughness R_{rms} (a unit of measurement of μm) with respect to a waveform having a wavelength P in a range of from 3 to 50 μm out of groups of waveforms constituting the cross-sectional waveform of said magnetic coating surface, satisfies the following equation:

$$R_{rms} \leqq 7.5 \times 10^{-4} P + 7.5 \times 10^{-3}$$

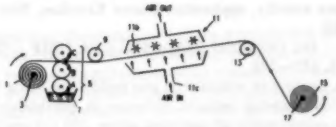
where $3 \leqq p \leqq 50$ μm.

4,684,547

FORMAT PATTERNING METHOD FOR MAGNETIC RECORDING MEDIA

Thomas H. DiStefano, Bronxville; Ralph L. Hollis, Jr., Yorktown Heights, both of N.Y.; Mark Johnson, Hamburg, Fed. Rep. of Germany, and Sherman S. Wang, Los Altos Hills, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 27, 1985, Ser. No. 814,349
Int. Cl.[4] H01F *10/00*
U.S. Cl. 427—131 **12 Claims**



1. A method for incorporating data recording servo control patterns onto a continuous sheet of flexible substrate material comprising the steps of:

(a) passing said material from a supply roll to a printer and printing a pattern of resist onto said material with said printer thereby forming a predetermined pattern of resist on said material and leaving portions of the surface of said substrate material exposed,

(b) next continuously depositing a thin film of a metal onto said pattern of resist material and the exposed surfaces of said substrate material, and, then,

(c) removing said resist material from said substrate material thereby lifting off the portion of said metal which had been deposited onto said resist material whereby the metal remaining on said substrate forms the servo-control pattern for locating a recording transducer over a data recording medium.

9. A method in accordance with claim 1 wherein said thin film of metal comprises a first and second layer of metal such that said first layer is an intermediate adhesion layer of a metal selected from the group consisting of Ti, Cr, Al, Mn, Mg and Si.

10. A method in accordance with claim 9 wherein said second layer of metal is selected from the group of metals consisting of Ti, Sn, Ta, V, Pd, Pt, W, Nb, Al, Cr, Ni and alloys CuAg, CuNi, AgPd, and TiAl.

4,684,548

METHOD FOR MODIFYING THE SURFACE STATE OF MATERIALS

Jean-Basile Chretien, Paris, France, assignor to AG-JBC (Sarl), Paris, France

PCT No. PCT/FR84/00072, § 371 Date Nov. 19, 1984, § 102(e) Date Nov. 19, 1984, PCT Pub. No. WO84/03664, PCT Pub. Date Sep. 27, 1984

PCT Filed Mar. 21, 1984, Ser. No. 683,269

Claims priority, application France, Mar. 25, 1983, 83 04908

Int. Cl.⁴ B05D *5/00, 1/06, 1/12, 1/14*

U.S. Cl. 427—197 **6 Claims**

1. A process for producing a relief design upon a surface of a material which comprises applying simultaneously a plurality of polymerizable typo-offset, silk screen printing or offset inks or varnishes having different polymerization temperatures and polymerization speeds to different parts of said surface, predrying the applied inks or varnishes at an appropriate temperature and for a period of time sufficient for polymerizing at least one but not all of the inks or varnishes, thereafter applying at least one batch of particles on to said surface which particles adhere exclusively to the not yet polymerized inks or varnishes, removing the excess particles of the batches by suction and/or blowing, and finishing the drying at a temperature and for a length of time appropriate for completing the polymerization of all the types of inks or varnishes.

4,684,549

IRON ORE PELLETIZATION

Anthony P. Allen, West Yorkshire, England; Sten Forsmo, Malmberget, Sweden, and John G. Langley, West Yorkshire, England, assignors to Allied Colloids Limited, England

Filed Nov. 26, 1986, Ser. No. 935,006

Claims priority, application United Kingdom, Nov. 29, 1985, 8529418

Int. Cl.⁴ B05D *7/00;* **C22C** *1/04;* **H01F** *1/02*

U.S. Cl. 427—221 **18 Claims**

1. A process in which iron ore pellets are made by adding binder comprising organic polymer to particulate iron ore having substantially all particles below 250 μm and stirring in the presence of 5 to 15% by weight water (based on total mix) to form a substantially homogeneous moist mixture and pelletising the moist mixture, characterised in that the binder comprises up to 0.2% by weight, based on total mix, of a water soluble synthetic polymer that has intrinsic viscosity 3 to 16 l dl/g and that is an anionic polymer of one or more water soluble ethylenically unsaturated monomers comprising an anionic monomer and that is added to the iron ore as a dry, free flowing, powder having substantially all particles above 20 μm and below 300 μm.

4,684,550

ELECTROLESS COPPER PLATING AND BATH THEREFOR

John W. Milius, Mars, and Jill D. Alderson, Harmony, both of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Apr. 25, 1986, Ser. No. 856,009

Int. Cl.⁴ C23C *18/40*

U.S. Cl. 427—437 **7 Claims**

1. An electroless copper plating bath substantially free of alkali metal ions and consisting essentially of an aqueous solution of

(1) about 0.6 to 6.4 g/l of a water soluble copper salt,

(2) about 6 to 50 g/l of ethlenediamine tetraacetic acid,

(3) about 2.5 to 12.5 g/l of dimethylamine borane,

(4) about 2.5 to 50 mg/l of thiodiglycolic acid,

(5) about 2.5 to 1000 mg/l of a surfactant reaction product of ethylene oxide and an acetylenic glycol, and

(6) sufficient ammonium hydroxide to adjust the pH between about 8.0 and 11.5.

4,684,551

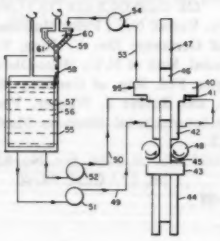
THIXOTROPIC MATERIAL COATING APPARATUS, DISTRIBUTOR DEVICE AND METHOD

Eustathios Vassiliou, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 6, 1986, Ser. No. 826,913

Int. Cl.⁴ B05C *3/10;* **B05D** *1/26*

U.S. Cl. 427—345 **10 Claims**



1. A distributor device for delivering a relatively uniform thickness of thixotropic coating composition to a curved surface of a substrate,

wherein the device is concentric with and surrounds a cylindrical opening into which is to be inserted the substrate to be coated, said device comprising at least one inlet port, a series of interconnected arcuate channels for dividing the flow of said coating composition, and at least 16 outlet ports for each inlet port, configured so that the length and cross section of the channels from each inlet port to each outlet port provide above the same resistance to the flow of coating composition,

wherein the channels are of about the same cross section, and the channels subdivide a number of times at branching points, with about the same length of channel going in each of two opposite directions from each branching point, thereby permitting the delivery of about equal flow rates of coating composition from each outlet port,

wherein said arcuate channels and branching points are recessed in a first face of a circular disk having a concentric opening in the middle to form an inner circumference and the second face opposite to said first face of said disk has a mirror image of said arcuate channels and branching points with a second inlet port about 180° opposite said first inlet port and with the branching points on each face

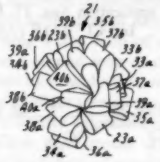
alternating around the inner circumference to form outlet ports, the size of such outlet ports being such that about 50% of the inner circumference is open for the delivery of coating on the first face, and the other 50% is open on the second face.

7. A method of coating a substrate with a relatively uniform thickness of thixotropic coating composition by providing such coating composition under pressure to the inlet ports of the device of claim 1, so that the coating composition is delivered at a uniform rate and pressure to each outlet port, wherein the substrate to be coated moves past the outlet ports at a constant velocity.

4,684,552
PREFABRICATED BOW FORM FOR A POM BOW

Paul R. LaBrosse, South St. Paul, and Daniel P. Pohl, Grant Township, Washington County both of Minn., assignors to Minnesota Mining & Manufacturing Company, St. Paul, Minn.

Filed May 19, 1986, Ser. No. 864,829
Int. Cl.[4] D04D 7/10
U.S. Cl. 428—4 **5 Claims**

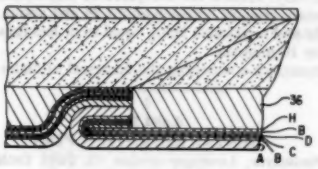


1. A prefabricated bow form for a pom bow comprising two bow ribbons of a first width having first and second ends and being disposed in opposed relationship, and at least one tie ribbon having first and second ends and being disposed centrally between said bow ribbons, the first ends of said bow and tie ribbons being firmly bonded together, said bow ribbons being bonded together at a plurality of spaced bonded areas adjacent both longitudinal edges of said tie ribbon so that said tie ribbon is unbonded to said bow ribbons but constrained between said bow ribbons, said spaced bonded areas defining fold lines extending across said bow ribbons about which fold lines the bow ribbons will fold when a bow is formed by gathering the bonded areas adjacent said first ends, said fold lines including spaced adjacent fold lines generally at right angles to the longitudinal edges of said bow ribbons and defining therebetween a generally central loop forming portion on each of said bow ribbons, and spaced fold lines between said central portion and both ends of said bow ribbons disposed at acute included angles with the longitudinal edges of said bow ribbons with said acute included angles with respect to each longitudinal edge being alternately disposed adjacent and opposite said first end, said fold lines between the central portions and said second ends of said bow ribbons forming at least two loop forming portions on each of said bow ribbons, and said fold lines between said central portion and said first ends together with said bond at the first ends of said ribbons forming at least three loop forming portions on each of said bow ribbons, and said fold lines at acute included angles adjacent said fold lines at right angles forming generally triangular portions on each of said bow ribbons at both ends of said central loop forming portion.

4,684,553
TRANSPARENT PLASTIC CAN

Hitoshi Sasaki, and Shoji Igota, both of Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,502
Claims priority, application Japan, Dec. 30, 1984, 59-280702
Int. Cl.[4] B65D 23/02; B32B 17/10
U.S. Cl. 428—35 **8 Claims**



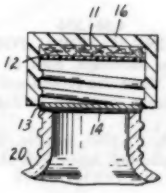
1. A transparent retortable container capable of preserving foods for a long period of time, which comprises:

a cylindrical body consisting of an inner cylindrical member which serves as the content-protecting layer and an outer coated plastic layer which supports the shape of said container, said inner cylindrical member being constructed of a laminated film consisting of at least three layers of a polyolefin layer, a polyester layer having silicon oxide deposited thereon and a plastic layer, the deposited silicon oxide layer being in contact with the polyolefin layer, said cylindrical body being formed by winding said laminated film around a mandrel, with said polyolefin layer facing inside and with one edge of said laminated film outwardly folded back so that the plastic layer comes into contact and bonds with itself, and joining one edge of the film to said folded edge by overlapping said edge over the folded edge and bonding the overlapped portion.

4,684,554
POLYMERIC COATING FOR CONTAINER INDUCTION INNERSEAL

David T. Ou-Yang, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 12, 1985, Ser. No. 722,822
Int. Cl.[4] B65D 1/02; C09J 7/02
U.S. Cl. 428—35 **12 Claims**



4. A container innerseal comprising a pulpboard backing, a layer of wax coated over said backing, metallic foil overlying said wax layer, and a polymeric layer coated over said metallic foil, said polymeric layer formed from a polymeric composition consisting essentially of from about 5 to about 27 percent by weight of paraffin wax or blend of paraffin wax and microcrystalline wax, from about 3 to about 50 percent by weight of polystyrene or derivative thereof having a softening temperature of at least about 75° C., from about 5 to about 45 percent by weight of rosin or derivative thereof having a softening temperature of at least about 70° C., and from about 30 to about 65 percent by weight of at least one high molecular weight polymeric material selected from the group consisting of ethylene/acrylic acid copolymers having an acrylic acid con-

tent of from about 3 to about 20 percent by weight and a melt index equal to or greater than about 2.5 grams per 10 minutes, ethylene/vinyl acetate copolymers having a vinyl acetate content of from about 8 to about 66 percent by weight and a melt index equal to or greater than about 1.5 grams per 10 minutes, ethylene/methacrylate copolymers containing approximtely 80 percent by weight ethylene and approximately 20 percent by weight methacrylate and having a melt index equal to or less than about 600 grams per 10 minutes, and ethylene/vinyl acetate/methacrylic acid terpolymers having a vinyl acetate content between about 24 and about 30 percent by weight and melt index being equal to or less than about 600 grams per 10 minutes.

5. A container comprising the innerseal of claim 4.

4,684,555

DENTAL RETENTION PINS

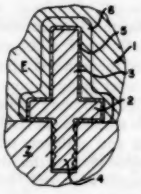
Stefan Neumeyer, Leminger strasse 10, 8491 Eschlkam, Fed. Rep. of Germany

Filed Feb. 10, 1986, Ser. No. 827,450

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1985, 352266; Sep. 2, 1985, 3504472

Int. Cl.[4] B32B *15/00, 9/00;* A61C *8/00*

U.S. Cl. 428—36 25 Claims



1. Dental retention pin comprising a first section to be inserted into the tooth substance and a second section extending into the filling structure and improving its retention to the tooth, wherein the retention pin is provided with a closed cylindrical or cup-shaped coating at least on said second section for increasing or alternatively improving the retention force, which coating includes at least one bond assisting layer, which undergoes a chemical or physical-chemical bond with the pin material and the material of the filling structure, is applied to the pin and is resistive to the wet conditions within the mouth.

4,684,556

TUBULAR LINING MATERIAL FOR PIPE LINE

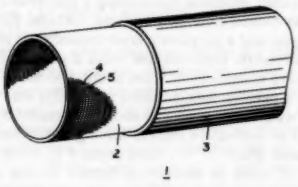
Hisao Ohtsuga; Akio Morinaga, both of Kanagawa; Yoichi Sakaguchi, Tokyo; Masakatsu Hyodo, and Isaburo Yagi, both of Osaka, all of Japan, assignors to Tokyo Gas Co., Ltd., Tokyo, Japan

Filed Feb. 13, 1985, Ser. No. 701,209

Claims priority, application Japan, Feb. 14, 1984, 59-20033[U]

Int. Cl.[4] F16L *55/18*

U.S. Cl. 428—36 12 Claims



1

1. A tubular lining material readily adaptable to a pipe line which has a relatively large inner diameter and which is either substantially straight or includes a plurality of bends or curved portions, in such a manner that said tubular lining material with a binder on the inner surface thereeof may inserted into the pipe line and allowed to advance within the pipe line with or without the aid of a leading rope-like elongated material while turning said tubular lining material inside out under fluid pressure thereby applying said tubular lining material onto the inner surface of the pipe line, with said binder being interposed between the pipe line and the tubular lining material, said lining material comprising a tubular textile jacket made of warps and a weft, knitted or woven in a tubular form, overcoated with an air-impervious coating of a flexible synthetic resin, said warps consisting essentially of crimped yarns of polybutylene terephthalate fibers and said weft consists essentially of a yarn of synthetic fibers.

4,684,557

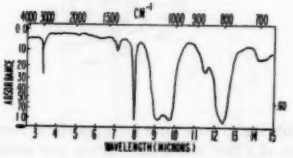
SILICONE PRESSURE-SENSITIVE ADHESIVE LAMINATES AND SILICONE RELEASE LAYERS THEREFORE

John R. Pennace, Cambridge, Mass., and Sharon A. Quinn, Brookline, N.H., assignors to Flexcon Company, Inc., Spencer, Mass.

Continuation of Ser. No. 99,265, Feb. 20, 1980, abandoned, which is a continuation of Ser. No. 58,983, Jul. 10, 1979, abandoned, which is a continuation of Ser. No. 969,254, Dec. 13, 1978, abandoned, which is a continuation of Ser. No. 759,154, Jan. 13, 1977, abandoned, which is a continuation-in-part of Ser. No. 558,324, Mar. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 538,588, Jan. 6, 1975, abandoned. This application Aug. 27, 1981, Ser. No. 296,701

Int. Cl.[4] A61F *13/02*

U.S. Cl. 428—40 10 Claims



1. An article comprising

a support having a release on at least one side, and a pressure sensitive alkylarylpolysiloxane adhesive over the release;

said release comprising the cross-linked reaction product of (a) a polysiloxane prepolymer having two or more reactive vinyl groups and (b) a polysiloxane prepolymer having more than two reactive hydrogen groups, said release prepolymers having a viscosity below about 1000 centipoises at 25° C.

4,684,558

ADHESIVE POLYETHYLENE OXIDE HYDROGEL SHEET AND ITS PRODUCTION

Preston Keusch, New York, N.Y., and John L. Essmyer, Hasbrouck Heights, N.J., assignors to Nepera Inc., Harriman, N.Y.

Filed Jun. 30, 1986, Ser. No. 879,876

Int. Cl.[4] B32B *27/00*

U.S. Cl. 428—40 14 Claims

1. A method for producing an adhesive sheet of hydrophilic gel which comprises the step of subjecting a liquid film of an aqueous solution having a viscosity of about $2\text{–}2{,}000\times10^3$ cps of a linear water soluble polyethylene oxide having a weight average molecular weight from about $0.02\text{–}6\times10^6$ Daltons, to an amount of high energy radiation from about 0.2 to 5.0 Mrads effective to convert the liquid film to a sheet of the viscoelastic solid having an adhesive face which in the rolling

ball tack test gives a rolling ball distance of less than about 10 mm and gives an adhesion energy force in the Adhesion Energy Density Determination Test of about 2 to 80 g-cm/cm^2, which adhesive sheet has greater cohesive strength than adhesive strength, whereby the sheet can be removed from a surface to which it is affixed without leaving a visible residue.

4,684,559

HAND IMPLEMENT SUPPORT APPARATUS

Andrew J. Wasko, Box 100, R.D. #1, Loretto, Pa. 15940

Filed Sep. 26, 1986, Ser. No. 912,383
Int. Cl.^{4} B32B *3/06*
U.S. Cl. 428—100 **9 Claims**

1. In an accessory adapted for use by the user of a manual implement to enhance the manual grip of the user on the implement handle, the combination comprising:

an elongated webb of resiliently extensible material having a retention end portion adapted to be retained with respect to such an implement handle and a free end portion opposite said retention end portion;

a closed loop formed adjacent said retention end portion, said closed loop being resilently distendable to encompass and resiliently grip such an implement handle;

said closed loop comprising a first loop of said resiliently extensible material and a second loop of elastic material disposed within said first loop, said elastic material having a greater magnitude of resilient tension per unit of elastic elongation than said resiliently extensible material;

an elongated non-extensible band means affixed adjac ..t said free end portion of said webb of material and extending in longitudinal alignment therewith;

said elongated webb being adapted to be wrapped continuously in multiple turns and with a varying magnitude of resilient tension about such an implement handle and adjacent portions of the hand and wrist of such a user manually gripping such implement handle with said elongated band being wrapped in at least one turn about said multiple turns; and

securing means associated with said non-extensible band for securing said non-extensible band in encompassing relationship about said multiple turns to provide flexible load bearing support of such an implement for manipulation thereof by such a user.

4,684,560

PRINTED WIRING BOARD HAVING CARBON BLACK-COATED THROUGH HOLES

Karl L. Minten, Cannock, United Kingdom, and Galina Pismennaya, Palisades Park, N.J., assignors to Olin Hunt Specialty Products, Inc., Palisades Park, N.J.

Division of Ser. No. 802,892, Nov. 29, 1985, Pat. No. 4,619,741, which is a continuation-in-part of Ser. No. 721,964, Apr. 11, 1985, abandoned. This application May 1, 1986, Ser. No. 858,328
Int. Cl.^{4} B32B *9/00*; C04B *14/36*; C08K *3/04*; C09C *1/44*
U.S. Cl. 428—131 **7 Claims**

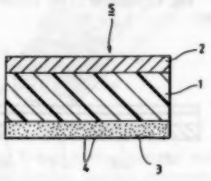
1. A printed wiring board having at least one through hole, the walls of said through hole having a substantially continuous layer of carbon black having an average particle size of less than about 3.0 microns and a surfactant deposited on the nonconductive portions of said through hole.

4,684,561

COLOR SHEETS FOR THERMAL TRANSFER PRINTING

Akihiro Imai, Ikoma; Tokihiko Shimizu, Nara, and Nobuyoshi Taguchi, Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Continuation of Ser. No. 654,934, Sep. 27, 1984, abandoned. This application Sep. 23, 1986, Ser. No. 910,832
Claims priority, application Japan, Sep. 28, 1983, 58-181008; Oct. 12, 1983, 58-190101; Feb. 20, 1984, 59-30541; Apr. 16, 1984, 59-76038; Apr. 16, 1984, 59-76039
Int. Cl.^{4} B41M *5/26*
U.S. Cl. 428—141 **10 Claims**



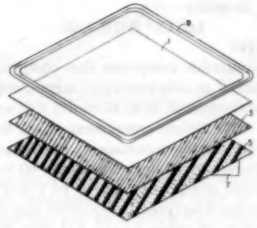
1. A color sheet for thermal transfer printing which comprises a polymer film substrate having a colorant layer on one side thereof, and a resin layer having a roughened outer surface formed on the opposite side of said film substrate, said resin layer being made of a composition which comprises a cured resin binder, 5.0 to 100 wt % of fine particles of a heat-resistant solid material having an average size of from 0.005 to 0.5 micrometers and 0.1 to 50 wt % of a liquid lubricant dispersed throughout the resin binder, both based on the resin binder, said resin layer being made rough on the outer surface thereof by the fine particles.

4,684,562

MAT FOR ABSORBING OIL AND OTHER LIQUIDS

Robert Hartkemeyer, 3998 Cinti-Brkvl Rd., Hamilton, Ohio 45013

Filed Mar. 19, 1985, Ser. No. 713,707
Int. Cl.^{4} B32B *9/06*
U.S. Cl. 428—182 **13 Claims**



1. A mat for absorbing oil and other liquids comprising:

(a) a first, top sheet for absorbing said oil and other liquid, said top sheet comprising cardboard material;

(b) a second, intermediate sheet for absorbing said oil and other liquid, said second sheet being disposed beneath and supporting said top sheet;

(c) a liquid resistant bottom sheet, said bottom sheet being disposed beneath said intermediate sheet and supporting said intermediate sheet; and

(d) means for securing said top sheet, said intermediate sheet, and said bottom sheet together, wherein said securing means prevents misalignment of said sheets and surrounds the perimeter of said mat defined by the respective edges

of said top sheet, said intermediate sheet and said bottom sheet.

4,684,563

ELECTROTHERMAL TRANSFER RECORDING SHEET

Seiichi Hayashi; Katsumori Takei, and Yoshitaka Yamaguchi, all of Suwa, Japan, assignors to Seiko Epson Kabushiki Kaisha, Tokyo, Japan

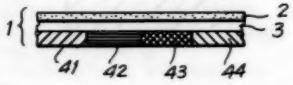
PCT No. PCT/JP84/00469, § 371 Date May 31, 1985, § 102(e) Date May 31, 1985

PCT Filed Oct. 4, 1984, Ser. No. 744,095

Claims priority, application Japan, Oct. 4, 1983, 58-185562

Int. Cl.[4] B32B *5/16, 27/06*

U.S. Cl. 428—207 **15 Claims**



1. An electrothermal transfer recording sheet, comprising:

a support layer;

a current-passing resistance layer integrally bound to the support layer on one surface thereof, the resistance layer formed from carbon black and a resin binder with the carbon black having a DBP oil absorption capacity of at least 300 m/100 g; and

an ink layer integrally bound to the opposed surface of the support layer.

4,684,564

HEAT-LAMINATING COMPOSITE FILM AND LAMINATED MATERIAL USING THE SAME

Kenji Satoh, Tondabayashi; Isao Kaneshige, and Kyoichiro Ikari, both of Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed May 8, 1985, Ser. No. 731,927

Claims priority, application Japan, May 14, 1984, 59-97362; May 16, 1984, 56-99451

Int. Cl.[4] B32B *7/02*

U.S. Cl. 428—216 **13 Claims**

1. A heat-laminatable composite film comprising (A) a saponified product of an ethylene-vinyl acetate copolymer having an ethylene content of 20 to 60 mol% and a saponificaton degree of the vinyl acetate component of not less than 95%, (B) a reactive polyurethane containing isocyanate groups and (C) a vinyl chloride copolymer containing 60 to 99 mol% of the vinyl chloride component and 40 to 1 mol% of a vinyl acetate and/or (meth)acrylate component, said film, having a layer construction of either Layer A/Layer B/Layer C or Layer A/Layer of a mixture of B and C.

4,684,565

X-RAY MIRRORS MADE FROM MULTI-LAYERED MATERIAL

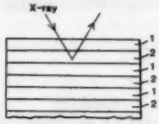
Benjamin Abeles, Annandale; Wolfgang U. Eberhardt, High Bridge, and J. Thomas Tiedje, Lebanon, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Nov. 20, 1984, Ser. No. 673,270

Int. Cl.[4] B32B *7/02*

U.S. Cl. 428—220 **13 Claims**

1. An X-ray mirror comprising a multilayered material wherein the layers forming the structure are made of amorphous semiconductor or insulator material such that the composition of the layers repeat, periodically said repeat distance being between 8 and 250A.



4,684,566

POLYESTER YARN AND FABRIC MADE OF THE SAME

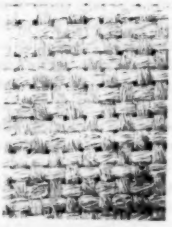
Yoshiyuki Sasaki, Takatsuki, and Katsuyuki Kasaoka, Ibaraki, both of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Dec. 23, 1985, Ser. No. 812,246

Claims priority, application Japan, Dec. 21, 1984, 59-270633; Oct. 4, 1985, 60-220153; Oct. 8, 1985, 60-222664

Int. Cl.[4] D03D *3/00*

U.S. Cl. 428—224 **9 Claims**



1. A fabric made of a synthetic multi-filament yarn having the appearance and hand like a fabric made of a spun silk yarn, wherein the filaments comprising said multi-filament yarn are arranged in various orientations within the yarn structure so that a part thereof are crossed with each other and wherein a first part of said filaments have a longer length relative to a second remaining part of the filaments of said yarn so that the first part filaments are bulged out from the surface of said fabric and said bulged filaments are essentially free of crimps, loops or cut end fluff on the surface of the fabric, but undulate thereon with various orientation angles and curvatures, wherein at least a portion of the first part filaments have wrinkled areas disposed intermittently along the length of the filament, each wrinkled area comprising a plurality of corrugations formed by protuberances on the surface of the filament, each corrugation encircling substantially the entire periphery of said filament perpendicular to the axis of said filament, and wherein a ratio of the number of said bulged out filaments to that of the total filaments forming the fabric surface is within a range of from 3 to 25%.

4,684,567

REINFORCED STRUCTURAL MATERIAL AND REINFORCED FIBROUS INORGANIC STRUCTURE REINFORCED THEREWITH

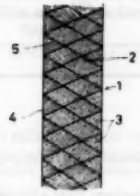
Tadashi Okamoto, Fujisawa; Sumiyuki Matsubara, Matsudo, and Masahisa Handa, Tama, all of Japan, assignors to Mitsui Kensetsu Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 13, 1986, Ser. No. 874,101

Claims priority, application Japan, Jun. 15, 1985, 60-129164; Jul. 2, 1985, 60-143898

Int. Cl.[4] B32B *7/00*

U.S. Cl. 428—257 **20 Claims**



1. A reinforcing braid comprising a plurality of fiber assembly cords interwoven to form a braid, each of said cords comprising a plurality of fibers, and said braid being impregnated with a bonding agent for bonding together said plurality of fibers and for bonding together said plurality of cords.

4,684,568

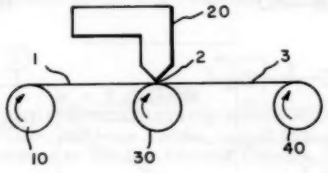
VAPOR-PERMEABLE LIQUID-IMPERMEABLE FABRIC

Gene W. Lou, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 21, 1986, Ser. No. 854,211

Int. Cl.[4] B05D *3/02, 3/12;* B32B *7/00, 27/00*

U.S. Cl. 428—265 **6 Claims**



5. A vapor-permeable, liquid-water-impermeable fabric which consists essentially of

a coated fibrous base sheet of polypropylene or polyester filaments weighing in the range of 50 to 125 g/m^2, the filaments having a dtex per filament in the range of 1 to 20,

and at least one flat surface of the fibrous base sheet having a calendered coating layer of polypropylene which has a melt flow rate in the range of 30 to 150, the coating layer having a unit weight in the range of 5 to 15 g/m^2 and containing a multiplicity of small pores which permit substantial flow of gas, but prevent substantial flow of liquid water,

the fabric having a moisture vapor transmission of at least 200 g/m^2/day and a hydrostatic head of at least 20 cm.

4,684,569

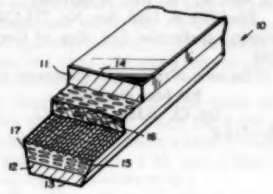
REINFORCED V-BELT CONTAINING FIBER-LOADED NON-WOVEN FABRIC AND METHOD FOR PRODUCING SAME

James N. McGee, Jr., Pleasant Garden, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Continuation-in-part of Ser. No. 484,367, Apr. 12, 1983, Pat. No. 4,598,013. This application May 5, 1986, Ser. No. 859,435

Int. Cl.[4] B32B *27/00*

U.S. Cl. 428—286 **7 Claims**



1. A reinforced V-belt having bottom, middle and top portions thereof, said bottom portion comprising a layer of bias cushion fabric and one or more layers of a fiber-loaded non-woven fabric wherein at least 70% of the fibers in said non-woven fabric are oriented generally perpendicular to the longitudinal axis of said non-woven fabric, said middle portion comprising a rubberized cord and a layer of said fiber-loaded non-woven fabric disposed on top of said rubberized cord, and said top portion comprising bias cushion fabric, said fiber-loaded non-woven fabric having first and second solutions impregnated therein.

4,684,570

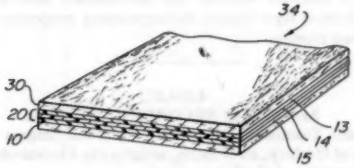
MICROFINE FIBER LAMINATE

Frank E. Malaney, Milton, Mass., assignor to Chicopee, New Brunswick, N.J.

Continuation-in-part of Ser. No. 667,689, Nov. 2, 1984, abandoned, which is a division of Ser. No. 588,038, Mar. 9, 1984, Pat. No. 4,508,113. This application Apr. 7, 1986, Ser. No. 850,063

Int. Cl.[4] A61F *13/00;* A61M *15/08;* B32B *27/00;* D04H *1/04*

U.S. Cl. 428—296 **7 Claims**



1. A water impervious laminated material comprising at least one layer of conjugate fibers, said layer of conjugate fibers having a first face and an opposite face, said conjugate fibers being composed of a lower melting component and a higher melting component, wherein a substantial proportion of the surfaces of said conjugate fibers comprises said lower melting component, said lower melting component of said conjugate fibers which lie on said first face being area fuse bonded to a first ply of a hydrophobic structure comprising multiple thermoplastic plies of microfine fibers having a fiber diameter of up to 10 microns, which structure comprises said first ply and at least one additional ply, said first ply of said hydrophobic microfine fiber structure possessing a lower melt temperature than said additional ply of said hydrophobic microfine fiber structure, said lower melting component of said conjugate fibers having been fuse bonded at a temperature below the melt temperature of said higher melting component of said conjugate fibers so that the latter component retains its initial fiber-

like integrity, said first ply of said microfine fiber structure having melt compatibility with said lower melting component of said conjugate fibers.

4,684,571

LIGHT DIFFUSING INSULATING GLASS ELEMENT

Heinz Kunert, Cologne, and Hermann-Wolf Jbach, Remscheid, both of Fed. Rep. of Germany, assignors to Vegla Vereinigte Glaswerke GmbH, Aachen and JMC Acrylguss GmbH & Co., Remscheid, both of, Fed. Rep. of Germany

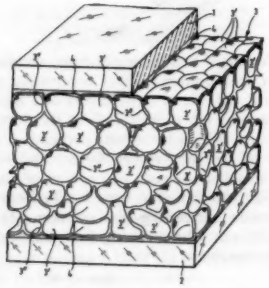
Filed Sep. 6, 1985, Ser. No. 773,124

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1984, 3432761

The portion of the term of this patent subsequent to Nov. 4, 2003, has been disclaimed.

Int. Cl.[4] B32B *3/26, 7/12*

U.S. Cl. 428—314.8 **21 Claims**



1. A light diffusing glass insulation element, comprising

a pair of outer silicate glass panels,

a light transmissive intermediate layer disposed between said glass panels, said intermediate layer being made from an acrylic foam, said intermediate layer being substantially greater in thickness than said glass panels, and

an adhesive layer binding at least one of said glass panels to said intermediate layer, said adhesive layer being made from a solvent free, ultraviolet-light curing acrylic adhesive material, wherein said intermediate layer and said adhesive layer impart shatterproofing properties to said glass element.

4,684,572

MAGNETIC RECORDING MEDIUM

Yoshitaka Yasufuku, Hino; Masaji Nara, and Shigeru Akutsu, both of Hachioji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Apr. 23, 1985, Ser. No. 726,034

Claims priority, application Japan, Apr. 27, 1984, 59-83899

Int. Cl.[4] G11B *5/68*

U.S. Cl. 428—323 **6 Claims**

1. A magnetic recording medium comprising a support, a magnetic layer on said support and a backing coat layer formed on the other side of said support, wherein said backing layer consists essentially of

a binder resin,

a conductive carbon black having a mean particle size of from 0.02 μm to 0.029 μm in the range of 25% to 100% by weight of said binder,

an organic powder having a mean particle size of from 0.01 μm to 0.5 μm in the range of 1% to 50% by weight of said binder, and

said backing layer having a surface roughness in the range of 0.005 μm to 0.035 μm and an electric resistivity in the range of 10Ω cm to 10^6Ω cm.

4,684,573

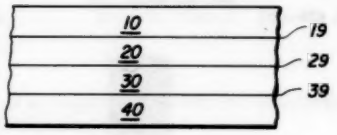
HIGH OXYGEN BARRIER COMPOSITE FILM

Walter B. Mueller, Taylors, and Henry G. Schirmer, Spartanburg, both of S.C., assignors to W. R. Grace & Co., Cryovac Div., Duncan, S.C.

Continuation of Ser. No. 709,010, Mar. 7, 1985, abandoned. This application Mar. 10, 1986, Ser. No. 839,441

Int. Cl.[4] C09J *7/02;* **B32B** *27/08*

U.S. Cl. 428—349 **10 Claims**



1. A thermoplastic, composite film comprising:

(a) a first component film comprising an abuse-resistant layer;

(b) a second component film adhered to one surface of the first component film;

(c) a third component film adhered to a surface of the second component film opposite said first component film; and

(d) a fourth component film adhered to a surface of the third component film opposite said second component film and comprising a heat sealable layer;

wherein one of said second and third component films comprises an individually extruded vinylidene chloride copolymer, and the other of said second and third component films comprises an ethylene vinyl alcohol copolymer.

4,684,574

PROCESS FOR ENCAPSULATING DISSOLVED REACTANTS OF COLOR REACTION SYSTEM AND RESULTING CAPSULES

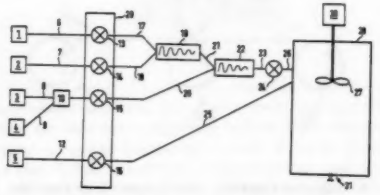
Gunther Pietsch, Isernhagen, and Claus Hartmann, Hanover, both of Fed. Rep. of Germany, assignors to Papierfabrik August Koehler AG, Fed. Rep. of Germany

Filed Mar. 5, 1985, Ser. No. 708,284

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1984, 3408745; Nov. 19, 1984, 3442268

Int. Cl.[4] B01J *13/02;* **B32B** *27/24*

U.S. Cl. 428—402.2 **19 Claims**



1. A process for preparing encapsulated preparations of components, which comprises:

dissolving an effective amount for use in a color reaction system of at least one component selected from the group consisting of (i) color formers and (ii) acid reactants in a solvent in which said amount of said component is soluble, to form a component-solvent solution;

admixing in said solution, in an amount sufficient to form a supersaturated solution with respect to said component, a non-solvent fluid in which said component is essentially insoluble; and without delay and while said supersaturated solution is fresh,

emulsifying and encapsulating said super-saturated solution.

13. An encapsulated preparation of a component suitable for use as a reactant in a color reaction system, said preparation being prepared in accordance with the process of claim 1.

4,684,575

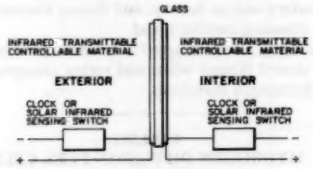
GLASS HAVING CONTROLLABLE INFRARED TRANSMISSION

Harry A. Beale, 1307 Windham Rd., Columbus, Ohio 43220

Continuation-in-part of Ser. No. 569,110, Jan. 9, 1984, Pat. No. 4,621,028, which is a continuation-in-part of Ser. No. 481,127, Apr. 1, 1983, abandoned. This application Oct. 31, 1985, Ser. No. 793,358

Int. Cl.[4] B32B *15/00, 17/06*

U.S. Cl. 428—434 **2 Claims**



1. A glass sheet provided at least on one side with a coating of silver mu aluminide, said coating transmitting visible light and adapted to be activated to reflect or transmit infrared energy by causing an electric current to be transmitted therethrough.

2. A glass sheet provided at least on one side with a coating containing V_2O_3 as its principal ingredient, said V_2O_3 containing a sufficient amount of at least one alloying element so that the transformation temperature of said V_2O_3 is elevated so that said coating will reflect infrared energy when the ambient temperature is above approximately 45° F.–60° F. and will transmit infrared energy when said ambient temperature is below approximately 45° F.–60° F., and wherein said glass sheet is provided on its other side with a coating containing silver mu aluminide as its principal ingredient, which coating may be activated to reflect or transmit infrared energy by causing an electric current to be transmitted therethrough.

4,684,576

MALEIC ANHYDRIDE GRAFTS OF OLEFIN POLYMERS

Ricky L. Tabor, and James A. Allen, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 641,087, Aug. 15, 1984, abandoned. This application Feb. 3, 1986, Ser. No. 825,161

Int. Cl.[4] B32B *17/10, 15/08, 21/08, 27/06*

U.S. Cl. 428—441 **28 Claims**

4. A laminate structure comprising at least one substrate having adhered to at least a portion thereof a blend consisting of grafted HDPE/ungrafted LLDPE copolymer, having a density in the range of 0.88 to 0.935 g/cc, or a blend of grafted HDPE/ungrafted LDPE, having a density in the range of 0.91 to 0.93 g/cc, wherein the grafted HDPE consists of HDPE, having initially a density in the range of 0.94 to 0.965 g/cc, which has been grafted with maleic acid or maleic anhydride, thereby providing succinic acid or succinic anhydride groups grafted along the HDPE polymer chain.

5. The laminate structure of claim 4 wherein at least one substrate consists of a metal, paper, wood, glass, or polymer material.

4,684,577

NON-STICK SILICONE BLEND COATING

Jean L. Coq, Benicarlo, Spain, assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Sep. 30, 1986, Ser. No. 913,401

Int. Cl.[4] B32B *9/04*

U.S. Cl. 428—447 **9 Claims**

1. A coating composition consisting essentially of a blend of two silicone resin precondensates and aluminum flake containing

60 to 95% by weight based on silicon solids of a first silicone resin precondensate which has 3.5–4.0% by weight silicon-bonded hydroxyl content, a ratio of methyl groups to silicon atoms of 1.10 to 1.20, and a ratio of phenyl groups to silicon atoms of 0.4 to 0.5,

5 to 40% by weight based on silicone solids of a second silicone resin precondensate which has 4–6% by weight silicon-bonded hydroxyl content, a ratio of methyl groups to silicon atoms of 1.20 to 1.30, and a ratio of phenyl groups to silicon atoms of 0.6 to 0.7,

1 to 8% by weight based on total solids of aluminum flake, and

liquid media,

said coating composition being at a solids content of 40 to 55% by weight.

4,684,578

MODIFIED ELASTOMER AND LAMINATE THEREOF

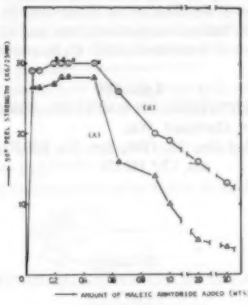
Hiroshi Inoue; Makoto Miyazaki; Masaaki Isoi, and Makoto Yoda, all of Saitama, Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 717,538, Mar. 29, 1985, which is a continuation of Ser. No. 196,076, Oct. 10, 1980, abandoned. This application Oct. 10, 1986, Ser. No. 918,165

Claims priority, application Japan, Oct. 12, 1979, 54-130835

Int. Cl.[4] B32B *15/08*

U.S. Cl. 428—462 **7 Claims**



1. A laminate comprising:

(A) a modified elastomer composition including modified elastomer and crystalline polyolefin prepared by the reaction of: 100 parts by weight of at least one elastomer selected from an ethylene/butene-1 copolymer, a styrene/butadiene copolymer and an ethylene/propylene copolymer wherein the ethylene content of said ethylene/-butene-1 copolymer comprises 10 to 90% by weight of said copolymer and is Mooney viscosity at 100° C. is 10 to 200; and wherein the styrene content of said styrene/-butadiene copolymer comprises 5 to 70% by weight of said copolymer and its Mooney viscosity at 100° C. is 10 to 200; and wherein the ethylene content of said ethylene/-propylene copolymer comprises 10 to 90% by weight of said copolymer, its Mooney viscosity at 100° C. is 10 to 200 and its density is 0.85 to 0.90, and not more than 50 parts by weight of crystalline polyolefin with 0.005 to

about 0.8 part by weight of an unsaturated carboxylic acid or its anhydride, and further including a radical generator and melting and kneading the mixture at 120° to 130° C., or

(B) a composition comprising (A) and a filler, and a material selected from the group consisting of metals, polyamides, polyesters, polyvinyl chloride and polyvinyl alcohol.

4,684,579

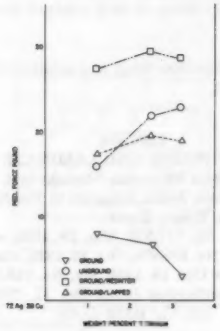
DUCTILE LOW TEMPERATURE BRAZING ALLOY FOIL

Howard Mizuhara, Hillsborough, Calif., assignor to GTE Products Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 823,200, Jan. 28, 1986, which is a continuation of Ser. No. 757,962, Sep. 20, 1984, Pat. No. 4,623,513, which is a continuation of Ser. No. 394,226, Jul. 1, 1982, abandoned. This application Jun. 23, 1986, Ser. No. 877,628

Int. Cl.[4] C22C *5/08*

U.S. Cl. 428—606 **3 Claims**



1. An article consisting essentially of a ductile foil of a brazing alloy consisting essentially of from about 1.75% to about 2.5% by weight of titanium, from about 64% to about 66% by weight of silver, balance copper wherein said alloy has a liquidus temperature of from about 600° C. to about 950° C.

4,684,580

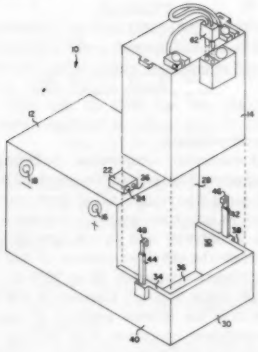
ELECTRIC STORAGE BATTERY ASSEMBLY

Scott L. Cramer, Hartland, Wis.

Filed Jan. 21, 1986, Ser. No. 820,025

Int. Cl.[4] H01M *10/42*

U.S. Cl. 429—9 **1 Claim**



1. An automotive storage battery assembly including:

(a) a primary storage battery provided with positive and negative poles;

(b) a secondary storage battery having positive and negative poles;

(c) a female coupling member adapted to be coupled to the positive and negative poles of one of said primary and secondary storage batteries and having a positive and negative receiver;

(d) a male coupling member adapted to be coupled to the positive and negative poles of the other of said primary and secondary storage batteries and having protruding positive and negative prongs to frictionally engage with said positive and negative receivers to electronically couple said primary and secondary storage batteries in parallel;

(e) walls of said primary storage battery casing defining an aperture having a dimension to snugly receive therein said secondary storage battery;

(f) spring clamping members on said primary storage battery on two spaced sides of said primary storage battery defining the aperture therein;

(g) slotted flanges on spaced ends of the top surface of said secondary storage battery, said flanges adapted to receive said clamping members; and

(h) a carrying handle adapted to be received at either end in said slotted flanges when said spring clamping members are disengaged therefrom.

4,684,581

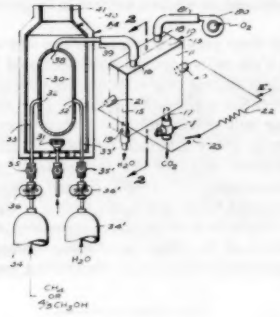
HYDROGEN DIFFUSION FUEL CELL

Ralph C. Struthers, 39503 Calle El Fuente, Saugas, Calif. 91350

Filed Jul. 10, 1986, Ser. No. 884,189

Int. Cl.[4] H01M *8/06*

U.S. Cl. 429—19 **20 Claims**

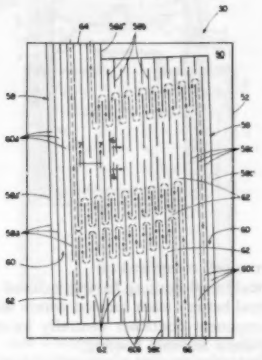


1. A fuel cell comprising; an elongate case; a thin, flat separator part of non-porous, di-electric, hydrogen-permeable material between the ends of and extending transverse the case and defining anode and cathode chambers therein; a thin, flat anode part of non-porous, electric conductive, hydrogen-permeable metalic material in the anode chamber in flat contacting engagement with and co-extensive with said separator part; a flat, porous, catalytic cathode part in the cathode chamber in contacting engagement with the separator part; hydrogen supply means supplying hydrogen to said anode part within the anode chamber; oxidant gas supply means supplying oxidant gas to the cathode part within the cathode chamber; and, an external electric circuit connected with and between the anode and cathode parts; said anode part absorbs and is permeated by hydrogen supplied to it and diffuses the hydrogen to hydrogen ions and free electrons; the free electrons in the anode part are conducted from the anode part into the electric circuit to perform useful work; the hydrogen ions in the anode part move from the anode part through the separator part and into the cathode part; free electrons are conducted by the electric circuit into the cathode part; the hydrogen ions, oxidant gas and free electrons in the cathode part react and generate waste, heat and water.

4,684,582
FUEL CELL PLATES WITH SKEWED PROCESS CHANNELS FOR UNIFORM DISTRIBUTION OF STACK COMPRESSION LOAD

Samuel J. Granata, Jr., Greensburg, and Boyd M. Woodle, North Huntingdon Twp., Westmorland County, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 4, 1985, Ser. No. 804,415
Int. Cl.[4] H01M *8/02*
U.S. Cl. 429—39 **7 Claims**



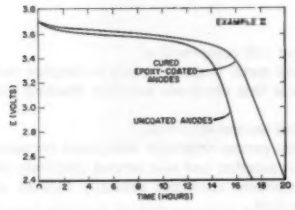
1. In an electrochemical fuel cell including an anode electrode, a cathode electrode, an electrolyte matrix sandwiched between said electrodes and a pair of plates above and below said electrodes, said plate above said electrodes having a lower surface with a first group of process gas flow channels formed thereon and said plate below said electrodes having an upper surface with a second group of process gas flow channels formed thereon, said channels of each group extending generally parallel to one another, the improvement which comprises:

said process gas flow channels on said lower surface of said plate above said anode electrode and said process gas flow channels on said upper surface of said plate below said cathode electrode being skewed in opposite directions such that contract areas of said surfaces of said plates through said electrodes are formed in crisscross arrangements.

4,684,583
ELECTROCHEMICAL CELL

Keith A. Klinedinst, Marlborough, and Richard A. Gary, Everett, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Oct. 16, 1986, Ser. No. 919,419
Int. Cl.[4] H01M *4/04, 6/14*
U.S. Cl. 429—48 **18 Claims**



1. An electrochemical cell comprising

an oxidizable anode electrode;

a cathode current electrode; and

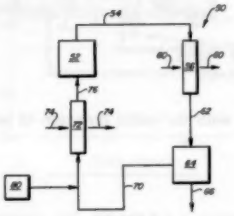
an electrolytic solution, in contact with the anode electrode and the cathode current collector, comprising a reducible liquid cathode material and an electrolyte solute dissolved therein;

the surface of the anode electrode in contact with the electrolytic solution being coated with a layer of cured epoxy resin.

4,684,584
ELECTROCHEMICAL POWER GENERATION WITH THERMAL ELECTROLYTE MANAGEMENT

Arnold Z. Gordon, Lyndhurst, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Filed May 20, 1986, Ser. No. 864,869
Int. Cl.[4] H01M *14/00*
U.S. Cl. 429—51 **22 Claims**



1. A method of power generation, said method comprising the steps of:

providing an electrochemical cell including a reactive metal anode, a cathode spaced from said anode to define a reaction zone, and an electrolyte comprising an aqueous solution of the hydroxide of said reactive metal and a common ion agent effective in increasing the thermal coefficient of solubility of said hydroxide in said electrolyte;

flowing said electrolyte through said reaction zone to generate electric power;

cooling said electrolyte flowing from said reaction zone to precipitate at least a portion of said reactive metal hydroxide;

separating at least a portion of said precipitate from said electrolyte; and,

recirculating said separated electrolyte to said electrochemical cell.

4,684,585
ELECTROCHEMICAL GENERATION APPARATUS AND METHOD

Pentti J. Tamminen, Espoo, Finland, assignor to LTH Associates (c/o Blaxley-Maddox), Boston, Mass.

Filed May 12, 1986, Ser. No. 862,490
Claims priority, application Finland, Oct. 11, 1985, 853968
Int. Cl.[4] H01M *2/38*
U.S. Cl. 429—69 **16 Claims**

1. A rechargeable electrochemical generator comprising

a rotatable container,

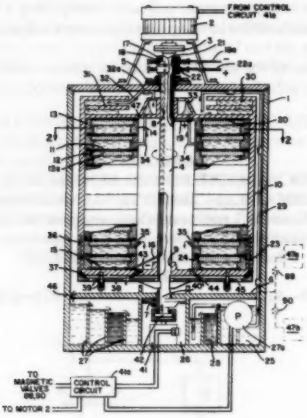
means for mounting in said container a plurality of electrode cell assemblies,

means for circulating an electrolyte solution through said cell assemblies,

means for rotating said container for subjecting said electrolyte solution to a centrifugal force,

each said electrode cell having an anode and a cathode electrode element, each said anode and each said cathode having a substantially planar surface in contact with said electrolyte solution, and

said mounting means positions said electrode cell assemblies so that the planar surfaces of said electrodes at least partially align with the radial direction of said centrifugal force.



4,684,586

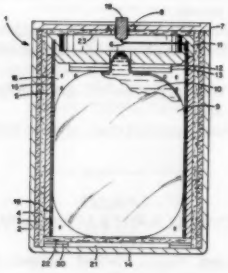
ELECTROCHEMICAL CELL WITH INTERLOCKING ANODE

Timothy B. Haskins, Concord; Franz Goebel, Sudbury; David C. Batson, Amesbury, and Charles R. Zuffante, W. Newton, all of Mass., assignors to GTE Government Systems Corporation, Waltham, Mass.

Filed Dec. 1, 1986, Ser. No. 936,299

Int. Cl.[4] H01M *6/30*

U.S. Cl. 429—115 **1 Claim**



1. A reserve cell comprised of:

a cylindrical metal housing having an interior wall;

a cylindrical cathode current collector member abutting the interior wall;

a cylindrical anode member with a spiral gap;

a cylindrical porous separator interposed between said cathode current collector member and said anode member;

a liquid cell component container centrally located within said housing; and

a continuous anode support cylinder located between said anode member and said container, said anode support cylinder having perforation into which said anode member is pressed, interlocking said anode member and said anode support cylinder.

4,684,587

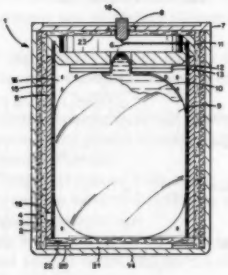
ELECTROCHEMICAL CELL WITH DISC ACTIVATOR

David C. Batson, Amesbury, and Franz Goebel, Sudbury, both of Mass., assignors to GTE Government Systems Corporation, Waltham, Mass.

Filed Dec. 1, 1986, Ser. No. 936,298

Int. Cl.[4] H01M *6/30*

U.S. Cl. 429—115 **1 Claim**



1. A reserve cell comprised of:

a cylindrical metal housing having a closed end;

a cylindrical battery stack located within said housing;

a cell component container centrally located within said battery stack and said housing;

a channeled ring located between an end of said battery stack and the closed end of said housing; and

a disc located in the center of said ring, for transmitting pressure from said closed end to said container.

4,684,588

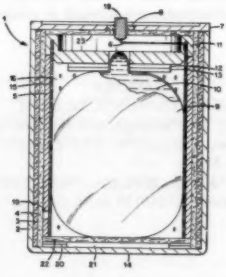
ELECTROCHEMICAL CELL WITH CONTAINER SUPPORT

Franz Goebel, Sudbury, and David C. Batson, Amesbury, both of Mass., assignors to GTE Government Systems Corporation, Waltham, Mass.

Filed Dec. 1, 1986, Ser. No. 936,300

Int. Cl.[4] H01M *6/30*

U.S. Cl. 429—115 **1 Claim**



1. A reserve cell comprised of:

a cylindrical metal housing having an interior wall;

a cylindrical first electrode member abutting said interior wall;

a cylindrical second electrode;

a cylindrical porous separator interposed between said first electrode member and said second electrode member;

a cell component container centrally located within said housing; and

a circular shim having a central socket, a circular groove, and an outer edge, said groove accepting one end of sec-

ond electrode and anode support cylinder and said socket holding one end of said container, said outer edge abutting the inner wall of said housing for supporting the spatial relationships of the cell.

4,684,589

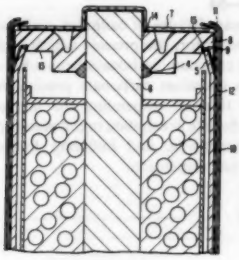
BATTERY SEAL

Ted J. Van Dyke, Jr., Middleton, Wis., assignor to Rayovac Corporation, Madison, Wis.

Filed Feb. 6, 1986, Ser. No. 826,567

Int. Cl.[4] H01M *2/08*

U.S. Cl. 429—184 **20 Claims**



1. A battery seal comprising a plug of air-tight material which fits within an open end of a battery jacket and which has a layer of sealant on at least one of its surfaces which face the interior of the battery, wherein the battery jacket is comprised of a material having sufficiently elastic properties to cause the jacket to regain its original shape after slight distortion under a temporary pressure, and wherein the battery jacket is crimped, along its edge which forms said open end, in a manner which causes the jacket to directly or indirectly compress the plug inward onto a receiving member such that the receiving member contacts the plug, in the region of the sealant, at a pressure which is sufficient to provide an air-tight seal between the plug and receiving member under normal battery storage and operating conditions yet is low enough to allow the plug to move sufficiently away from the receiving member in response to force exerted on the plug by abnormal gas pressure within the battery to vent said gas, wherein the plug reseats on the receiving member after said gas is vented to re-form an air-tight seal.

4,684,590

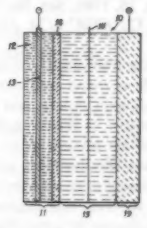
SOLVATED ELECTRON LITHIUM ELECTRODE FOR HIGH ENERGY DENSITY BATTERY

Anthony F. Sammells, Naperville, Ill., assignor to Eltron Research, Inc., Aurora, Ill.

Filed Aug. 29, 1986, Ser. No. 902,190

Int. Cl.[4] H01M *6/14*

U.S. Cl. 429—194 **10 Claims**



1. A solvated electron lithium negative electrode comprising: containment means holding a solution of lithium dissolved in in liquid ammonia to form a solvated electron solution, said solvated electron solution contacting a lithium intercalating membrane and providing lithium to said lithium intercalating membrane during discharge and accepting lithium from said lithium intercalating membrane during charge.

4,684,591

ACTIVE MATERIALS FOR BATTERIES

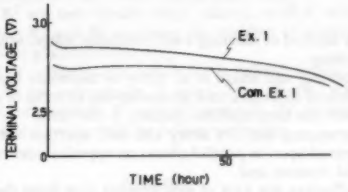
Kazuo Okamura, Itami; Satoshi Koyama, Osaka; Tadayuki Maeda, Settsu, and Tutomu Kamihigoshi, Takatsuki, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 618,697, Jun. 8, 1984, abandoned. This application Oct. 29, 1985, Ser. No. 793,465

Claims priority, application Japan, Jun. 9, 1983, 58-103667; Jul. 22, 1983, 58-134678

Int. Cl.[4] A01M *4/58*

U.S. Cl. 429—218 **3 Claims**



1. An electrolytic cell comprising a positive electrode, a negative electrode and a non-aqueous electrolyte; said positive electrode consisting essentially of, as an active material, a fluorinated graphite produced by reacting graphite with fluorine until there is essentially no residual graphite, as shown by X-ray diffraction, such fluorinated graphite being further characterized as having a fluorine content of from 48 to 58% by weight and as being capable of absorbing additional fluorine in an amount of at least 0.5% by weight, as determined by refluorination of said fluorinated graphite under the same or more severe reaction conditions, and said negative electrode being a metal selected from the group consisting of lithium, magnesium, calcium, aluminum and alloys thereof.

4,684,592

STIMULABLE PHOSPHOR SHEET

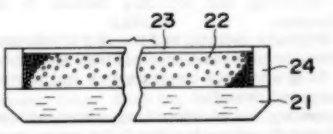
Terumi Matsuda, and Kaoru Tamura, both of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Apr. 8, 1985, Ser. No. 720,882

Claims priority, application Japan, Apr. 6, 1984, 59-69589; Apr. 6, 1984, 59-69590; Apr. 6, 1984, 59-69591

Int. Cl.[4] G03F *9/00*; G03C *5/16*; G01T *1/11*; G09K *11/08*

U.S. Cl. 430—6 **10 Claims**



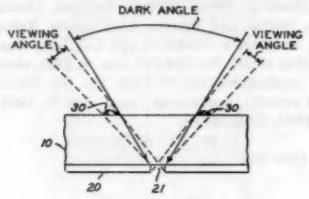
1. A stimulable phosphor sheet comprising a support, a phosphor layer containing a stimulable phosphor and a binder, and a protective film superposed in this order, which is characterized in that at least one of the front end and the rear end of the phosphor layer along the direction to be conveyed are retracted from the corresponding end of the support, and said retracted end of the phosphor layer and support is protected by a polymer coating layer or a polymer film.

4,684,593

SECURE AND SELF-VERIFIABLE IMAGE

Ralph C. Wicker, Rochester, N.Y., assignor to Secure Images Inc., Rochester, N.Y.

Division of Ser. No. 608,116, May 8, 1984, Pat. No. 4,632,430.
This application May 2, 1986, Ser. No. 859,146
Int. Cl.[4] B42D 15/00; G03F 5/00, 9/00
U.S. Cl. 430—6 11 Claims



1. A method of securing a self-verifiable image, said method comprising:

a. forming said image as an array of uniformly spaced dots viewed through a dark screen having an array of apertures with the same uniform spacing as said dots;

b. arranging said dot array and said aperture array to be spaced apart in parallel planes on opposite sides of a pellucid stratum; and

c. offsetting the axes of said arrayed dots from the axes of said arrayed apertures and making said dots and apertures sufficiently small relative to the reflective density of said dark screen and the thickness of said pellucid stratum so that said image is not viewable by light passing perpendicularly through said dark screen and said pellucid stratum and is viewable only by light passing obliquely through said pellucid stratum at an angle that intersects said arrayed apertures and said arrayed dots.

4,684,594

ELECTROPHOTOGRAPHIC PROCESS FOR PREPARING PRINTING FORMS USING ALKALINE DECOATER SOLUTION

Klaus Schmitt; Klaus-Peter Schoen, both of Wiesbaden; Peter Riedel, Huenfelden; Juergen Lingnau, Mainz-Laubenheim, and Engelbert Pliefke, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 9, 1986, Ser. No. 905,236
Claims priority, application Fed. Rep. of Germany, Sep. 11, 1985, 3532346
Int. Cl.[4] G03G 13/26
U.S. Cl. 430—49 13 Claims

1. An electrophotographic process for preparing printing forms or metallized images using recording material comprised of an electroconductive base material and a photoconductor layer provided on said base material, comprising the steps of

(A) subjecting said recording material to electrostatic chargeup;

(B) imagewise exposing and tonering of said photoconductive layer to produce tonered image areas thereon;

(C) fixing said toner image areas on said photoconductive layer; and thereafter

(D) treating said photoconductive layer with an aqueous-alkaline decoater solution such that nonimage areas of said photoconductive layer are removed and portions of said base material are exposed,

wherein said photoconductor layer contains (i) at least one organic, n-conducting pigment in a concentration between about 10 and 50 percent by weight, based on total weight of said photoconductor layer; (ii) an organic, p-conductor in a concentration of from 0 to 20 percent by weight, based on total weight of said photoconductor layer; and (iii) an amount of a binder that is soluble or dispersible in aqueous-alkaline solution, said amount being sufficient to stabilize said photoconductor layer structurally.

4,684,595

CADMIUM CARBONATE/CADMIUM SULFIDE PHOTOCONDUCTOR

Sixdeniel Faria, and Ronald E. Karam, both of Towanda, Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Mar. 26, 1984, Ser. No. 593,459
Int. Cl.[4] G03G 5/04
U.S. Cl. 430—94 4 Claims

1. In the manufacture of cadmium carbonate/cadmium sulfide photoconductor, the process which includes the steps of precipitating cadmium carbonate from a hot aqueous solution, digesting the cadmium carbonate precipitate to increase the particle size thereof, suspending the increased particle size cadmium carbonate precipitate in hot water to form a cadmium carbonate suspension, and bubbling hydrogen sulfide gas through the hot suspension.

4,684,596

ELECTROGRAPHIC TONER AND DEVELOPER COMPOSITION CONTAINING QUATERNARY AMMONIUM SALT CHARGE-CONTROL AGENT

Steven M. Bonser; Douglas E. Bugner, and Lawrence P. Demejo, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 18, 1986, Ser. No. 829,878
Int. Cl.[4] G03G 9/10
U.S. Cl. 430—110 14 Claims

1. A dry, particulate, electrostatic toner composition comprising

(a) a polymeric binder, and

(b) a charge-control agent comprising an N-benzyl quaternary ammonium salt, wherein the benzyl ring contains at least one substituent with a Hammett substituent constant that is greater than zero.

4,684,597

NON-PRECIPITATING QUINONE DIAZIDE POLYMER CONTAINING PHOTORESIST COMPOSITION WITH O-QUINONE DIAZIDE TRISESTER AS DISSOLUTION INHIBITOR

Barbara B. Lussier, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 25, 1985, Ser. No. 791,271
Int. Cl.[4] G03C 1/54, 1/58
U.S. Cl. 430—190 4 Claims

1. A positive-working photoresist composition comprising, in admixture, (a) a light-sensitive polymer containing a recurring pendant quinone diazide moiety, said polymer being present in an amount effective to render said resist composition light-sensitive, (b) a binder present in an amount effective to render said composition film-forming, and (c) a photoactive dissolution inhibitor present in an amount effective to crosslink said polymer in areas wherein said quinone diazide moiety is not decomposed by exposure to activating radiation, wherein said photoactive dissolution inhibitor is a diazo-naphthoquinone-sulfonyl ester of a 1,2,4-benzenetriol having each of said 1, 2 and 4 positions esterified with a diazo-naphthoquinone-sulfonyl group.

4,684,598

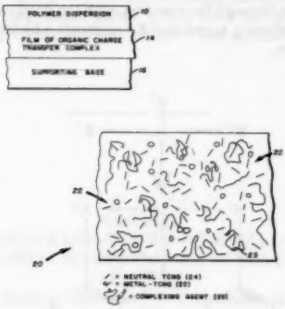
ENHANCED OPTICALLY SENSITIVE MEDIUM USING ORGANIC CHARGE TRANSFER MATERIALS TO PROVIDE REPRODUCIBLE THERMAL/OPTICAL ERASURE

Richard S. Potember, Catonsville, and Theodore O. Poehler, Baltimore, both of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Nov. 23, 1984, Ser. No. 674,129

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—269 **37 Claims**



1. An optically sensitive medium comprising:

an organic charge transfer complex having molecules of at least one organic charge transfer material, said at least one organic charge transfer material adapted to switch between at least two states having discernibly different optical characteristics in response to optical energy, and said at least one organic charge transfer material having at least one moiety; and,

a layer interspersed with a species of said at least one moiety, and covering at least a portion of said organic charge transfer complex for enhancing erasability of said organic charge transfer complex.

4,684,599

PHOTORESIST COMPOSITIONS CONTAINING QUINONE SENSITIZER

Thap DoMinh, Rochester; James C. Fleming, Webster, both of N.Y., and Michael J. Lindstrom, Downingtown, Pa., assignors to Eastman Kodak Company, Rochester, N.Y.

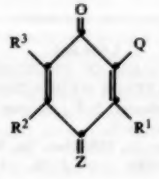
Filed Jul. 14, 1986, Ser. No. 885,122

Int. Cl.[4] G03C *1/495*

U.S. Cl. 430—270 **6 Claims**

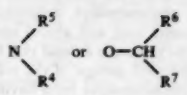
1. A positive-working imaging composition comprising a polymer binder and a sensitizer effective, when exposed to activating radiation, to provide alkali solubility to said composition,

characterized in that said sensitizer comprises a quinone having the structural formula:



wherein

Q is



R^1 is H, halo, akyl, alkoxy, aryl, aralkyl, alkaryl, cyano, or a heterocyclic ring,

R^2 and R^3 are individually H, aryl, alkaryl,

where each Ar is individually aryl, aralkyl, or alkaryl or together R^2 and R^3 comprise the number of carbon atoms that complete 1 or 2 fused carbocyclic rings,

R^4 and R^5 are individually alkyl, alkaryl, aralkyl, aryl, or together R^4 and R^5 comprise the number of atoms that complete a heterocyclic ring,

Z is =O or $=NSO_2—Ar$, where Ar is defined above,

R^6 and R^7 are individually H, alkyl, aryl, alkaryl, aralkyl, —OH, or together R^6 and R^7 comprise the atoms that complete a carbocyclic or heterocyclic ring.

4,684,600

COMPRESSIBLE PHOTOPOLYMER PRINTING PLATE

John R. Worns; James W. Chase, both of Mishawaka, and Bruce W. Capriotti, South Bend, all of Ind., assignors to Uniroyal Plastics Co., Inc., Mishawaka, Ind.

Continuation of Ser. No. 554,039, Nov. 21, 1983, Pat. No. 4,547,453, which is a continuation-in-part of Ser. No. 230,926, Feb. 2, 1981, abandoned. This application Oct. 2, 1985, Ser. No. 783,296

The portion of the term of this patent subsequent to Oct. 15, 2002, has been disclaimed.

Int. Cl.[4] G03C *1/24*

U.S. Cl. 430—271 **9 Claims**

1. A layered sheet construction suitable after processing for use as a relief printing plate having a thickness of at least 0.08 inch comprising

(A) a photosensitive image layer having a 300% modulus of elasticity of 100–1000 psi comprising 100 parts elastomeric polymer, 5 to 30 parts ethylenically unsaturated compound and 0.1 to 5 parts photoinitiator activatable by actinic radiation, all by weight; bonded to

(B) a closed cell, foamed layer wherein said layer is selected from the group consisting of EPDM (ethylene-propylene-diene termonomer polymer) and polyolefin having a thickness of 0.020–0.150 inch, a recovery rate of at least 80%, a compression value of 0.003–0.030 inch and density of 10–40 lbs/ft^3; bonded to

(C) a dimensionally stable supporting layer.

4,684,601

PHOTOSENSITIVE IMAGE-FORMING MATERIAL HAVING A LAYER OF PHOTOSENSITIVE POLYESTER MODIFIED WITH CHAIN EXTENDER

Chiaki Nakamura, Tokyo; Kouji Oe; Tomonobu Muta, both of Urawa, and Toshiki Sasaki, Kamifukuoka, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Division of Ser. No. 574,573, Jan. 27, 1984, Pat. No. 4,591,545. This application Feb. 6, 1986, Ser. No. 826,582

Claims priority, application Japan, May 10, 1983, 58-81282; Aug. 4, 1983, 58-142782; Sep. 8, 1983, 58-164149; Oct. 21, 1983, 58-196137

Int. Cl.[4] G03C *1/68*; C08G *18/81, 18/10*

U.S. Cl. 430—284 **9 Claims**

1. A process for producing a photosensitive resin, which comprises reacting a hydroxyl-container polyester precursor

composed of dicarboxylic acid units derived from a dicarboxylic acid having a photosensitive unsaturated double bond adjacent to an aromatic ring and glycol units, with a chain extender having in the molecule at least two functional groups reactive with the hydroxyl groups of the polyester precursor to thereby obtain a photosensitive resin having a weight average molecular weight of at least 40,000.

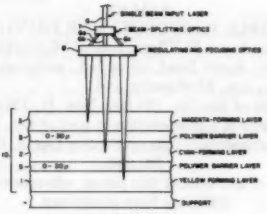
3. The process of claim 1 wherein the chain extender contains as the functional groups capable of reacting with the hydroxyl groups of the polyester precursor at least one kind of functional groups selected from the class consisting of aryl ester, aryl carbonate, n-acyllactam, N-acylmide, acid anhydride, benzoxiazinone, isocyanate, blocked isocyanate, oxazolonyl, N-acylimidazole, silanol, furoxane, aziridine, isothiocyanate, vinyl ether, ketene acetal, unsaturated cycloacetal and carbodiimide groups.

4,684,602

MULTICOLOR LASER RECORDING METHOD AND ELEMENT

Mark Lelental; James K. Lee, and Alan P. VanKerkhove, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 30, 1986, Ser. No. 880,432
Int. Cl.[4] G03C 7/00, 7/32
U.S. Cl. 430—363 **13 Claims**



1. A method of generating visible multicolor images comprising the steps of

(A) providing an image printing device comprising a single wavelength laser beam modulated with image information for generating at least two different colors;

(B) providing a multilayer color photographic imaging element which contains at least two different color imaging layers; wherein each layer

(i) forms a developable latent image;

(ii) has a short exposure latitude;

(iii) has a well defined sensitivity threshold; and

(iv) has a pronounced low intensity reciprocity failure; and

(v) sensitive to the laser radiation.

(C) exposing each image layer to the laser by focusing the laser beam in and raster scanning each imaging layer separately to form a latent color image in each layer; and

(D) developing a visible color image.

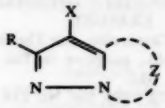
4,684,603

LIGHT-SENSITIVE SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Toyoki Nishijima, and Kaoru Onodera, both of Odawara, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

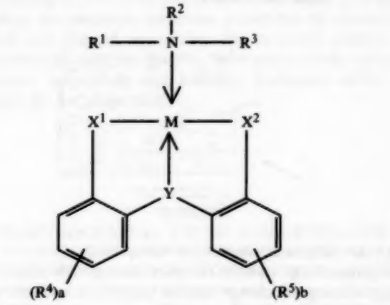
Filed Dec. 4, 1985, Ser. No. 805,120
Claims priority, application Japan, Dec. 12, 1984, 59-262339; Dec. 19, 1984, 59-269290
Int. Cl.[4] G03C 7/40, 7/26
U.S. Cl. 430—372 **19 Claims**

1. A light-sensitive silver halide photographic material, which comprises at least one coupler represented by the formula (I) shown below and at least one of the compounds represented by the formulae (XI) and (XII) shown below:

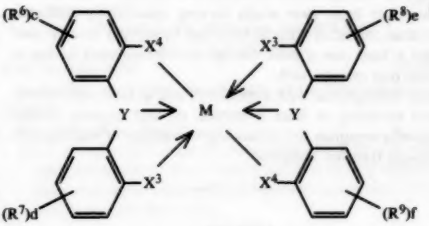


(I)

wherein Z represents a group of non-metallic atoms for forming a nitrogen-containing heterocyclic ring which may have a substituent; X represents a hydrogen atom or a substituent eliminatable through the reaction with the oxidized product of a color developing agent; and R represents a hydrogen atom or a substituent,



(XI)



(XII)

wherein X^1, X^2 and X^4 each represents an oxygen atom, a sulfur atom or $—NR^{10}—$ (R^{10} represents a hydrogen atom, an alkyl group, an aryl group or a hydroxyl group); X^3 represents a hydroxyl group or a mercapto group; Y represents an oxygen atom or a sulfur atom; R^1, R^2 and R^3 each represents a hydrogen atom, an alkyl group or an aryl group, provided that at least two of R^1, R^2 and R^3 represent alkyl groups or aryl groups; R^4, R^5, R^6, R^7, R^8 and R^9 each represents an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, an acyl group, an acylamino group, an arylamino group, an alkylamino group, a carbamoyl group, a sulfamoyl group, a sulfonamide group, a sulfonyl group or a cycloalkyl group, or they can be linked to each other to form a 5- or 6-membered ring; M represents a metal atom; and a, b, c, d, e and f each represent an integer of 0 to 4.

4,684,604

OXIDATIVE RELEASE OF PHOTOGRAPHICALLY USEFUL GROUPS FROM HYDRAZIDE COMPOUNDS

John W. Harder, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 24, 1986, Ser. No. 855,264
Int. Cl.[4] G03C 1/40, 1/34, 7/32, 5/54
U.S. Cl. 430—375 **20 Claims**

14. A process comprising:

(a) exposing a photographic element comprising a support

having thereon a silver halide emulsion layer having associated therewith a compound containing a hydrazide moiety attached by a linking group, comprising an acidic group or an active methylene group adjacent to an acidic group, to a heteroatom of a moiety containing a photographically useful group comprising a photographic dye or precursor thereof or a photographic reagent;

(b) developing said exposed element with a silver halide developing agent, thereby oxidizing said developing agent; and

(c) said hydrazide moiety then being oxidized in an imagewise manner to an azo group by said oxidized developing agent;

whereby said azo group formation causes the release of said photographically useful group which does not contain said linking group or the nitrogen atoms of said hydrazide moiety.

4,684,605

ELEMENTS HAVING HYDROPHILIC LAYERS CONTAINING HYDROPHOBES IN POLYMER PARTICLES

Herbert D. Remley, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 746,946, Jun. 21, 1985, Pat. No. 4,584,255, which is a continuation of Ser. No. 562,136, Dec. 16, 1983, abandoned. This application Feb. 3, 1986, Ser. No. 824,392

Int. Cl.[4] G03C *1/76*

U.S. Cl. 430—537 **6 Claims**

1. A radiation-sensitive element comprising a support having thereon one or more radiation-sensitive layers, and

a substantially crystal- and agglomeration-free hydrophilic layer comprising a hydrophilic composition comprising a hydrophilic binder and water-insoluble polymer particles dispersed therein, said polymer particles having recurring units characterized by the structure:

$$-(A)_w(B)_x(C)_y-$$

wherein -A- represents randomly recurring units derived from one or more vinyl aromatics, olefins and diolefins, vinyl esters or esters of α,β-unsaturated polymerizable carboxylic acids; -B- represents randomly recurring units derived from one or more ethylenically unsaturated polymerizable monomers having one or more anionic moieties; -C- represents randomly recurring units derived from one or more ethylenically unsaturated polymerizable monomers having a crosslinkable moiety; w represents a weight percent from about 80 to 100; x represents a weight percent of from 0 to about 20; and y represents a weight percent of from about 0 to about 5, all based on total monomer weight, and wherein said polymer particles comprise less than about 5 weight percent of other randomly recurring units derived from one or more ethylenically unsaturated polymerizable monomers other than -A-, -B-, or -C-,

said hydrophilic composition comprising from about 15 to about 70 weight percent, based on total dry weight of said hydrophilic composition, of said polymer particles, and said polymer particles comprising from about 0.5 to about 10 percent, based on total monomer weight, of a hydrophobe uniformly distributed throughout,

said substantially crystal- and agglomeration-free hydrophilic layer having less than 5 observable crystals of said hydrophobe in a 8.9×11.4 cm area of said hydrophilic layer as observed at 250× magnification.

4,684,606

STERICALLY HINDERED PHOTOGRAPHIC COUPLER SOLVENTS AND PHOTOGRAPHIC ELEMENTS EMPLOYING SAME

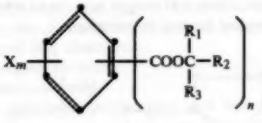
Sundaram Krishnamurthy, Penfield, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 24, 1985, Ser. No. 813,307

Int. Cl.[4] G03C *1/40, 7/32*

U.S. Cl. 430—546 **15 Claims**

1. A photographic element comprising a support having thereon at least one silver halide emulsion layer having associated therewith a dye-forming coupler and a coupler solvent therefor having the formula:



wherein

each X may independently represent a halogen atom, an alkyl group of from 1 to about 20 carbon atoms, an alkoxy group of from 1 to about 20 carbon atoms, or a carboxylic ester;

m represents an integer of 0 to 5;

n represents an integer of 1 to 4; and

R_1, R_2, and R_3 each independently represents a substituted or unsubstituted alkyl group; a substituted or unsubstituted alicyclic group, saturated or partially saturated; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aryl group; a substituted or unsubstituted heterocyclyl group; or may be combined together to form one or more nonaromatic rings;

with the proviso that the alpha hydrogens of R_1, R_2, and R_3 total no more than seven; and

with the further proviso that R_1 can additionally be hydrogen when

(a) R_2 and R_3 join together to form a ring substituted by no more than one alpha hydrogen or

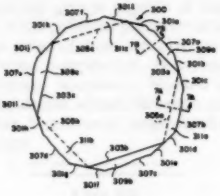
(b) R_2 and R_3 do not join to form a ring and if at least one of R_2 or R_3 contains an alpha carbon having two different non-hydrogen substituents.

4,684,607

TABULAR SILVER HALIDE EMULSIONS WITH LEDGES

Joe E. Maskasky, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 8, 1986, Ser. No. 904,737
Int. Cl.[4] G03C *1/02*
U.S. Cl. 430—567 **20 Claims**



1. A photographic emulsion comprised of
tabular silver halide grains having opposed major faces,
characterized in that tabular grains are present having ledges of relatively reduced thickness extending laterally beyond at least one of said major faces.

4,684,608

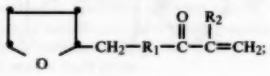
LATEX COMPOSITIONS COMPRISING LOADABLE POLYMERIC PARTICLES

James W. Brown, Spencerport; Tsang J. Chen, Rochester, both of N.Y., and Michael A. Schen, Amherst, Mass., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 660,157, Oct. 12, 1984, Pat. No. 4,608,424, which is a division of Ser. No. 399,404, Jul. 19, 1982, Pat. No. 4,497,929. This application Nov. 21, 1985, Ser. No. 800,197
Int. Cl.[4] G03C *1/02*
U.S. Cl. 430—629 **6 Claims**

1. An element comprising a support having thereon a layer comprising a polymer loaded with a hydrophobe; wherein the polymer has recurring units derived from components a, b and c; wherein

component a is 10 to 100 weight percent of a tetrahydrofurfuryl monomer having the structure:



in which

R_1 represents O or NH; and

R_2 represents H or lower alkyl of about 1 to 6 carbon atoms;

component b is 0 to 20 weight percent of a hydrophilic monomer selected from the group consisting of hydroxyethyl acrylate, hydroxyethyl methacrylate, hydroxypropyl acrylate, hydroxypropyl methacrylate, 3-chloro-2-hydroxypropyl acrylate, 3-chloro-2-hydroxypropyl methacrylate, 2,2-dimethylhydroxypropyl acrylate, 5-hydroxypentyl acrylate, diethylene glycol monoacrylate trimethylolpropane monoacrylate, pentaerythritol monoacrylate, 2,2-dimethyl-3-hydroxypropyl acrylate, 5-hydroxypentyl methacrylate, diethylene glycol monomethacrylate, trimethylolpropane monomethacrylate, pentaerythritol monomethylacrylate, N-methylolmethacrylamide, N-ethyl-N-methylolmethacrylamide, N-ethyl-N-methylolacrylamide, N,N-dimethylolacrylamide, N-ethanolacrylamide, N-propanolacrylamide, N-methylolacrylamide, and sodium 2-acrylamido-2-methylpropane sulfonate and

component c is 0 to 90 weight percent of a hydrophobic monomer selected from the group consisting of vinylidene chloride, styrene, vinyl chloride, vinyl acetate, acrylates and methacrylates; and the hydrophobe is selected from substantially water-insoluble, oleophilic photographic addenda.

6. The element of claims 1, 2 or 3 comprising a silver halide photographic layer.

4,684,609

METHOD AND SUBSTANCE FOR THE ENHANCED LABELLING OF CELLULAR MATERIAL

Su-Ming Hsu, Seekonk, Mass., assignor to Vector Laboratories, Inc., Burlingame, Calif.

Filed Jun. 15, 1981, Ser. No. 273,813
Int. Cl.[4] G01N *33/54*; C12N *9/96*
U.S. Cl. 435—7 **9 Claims**

1. A method for localizing markers on a prepared tissue section, said method comprising:

exposing the tissue section to a primary reagent capable of specifically binding to the marker;

exposing the tissue section to biotinylated antibody raised against the primary reagent;

exposing the tissue section to a preformed labelling complex formed by reacting avidin and a biotinylated macromolecules, wherein at least some of said biotinylated macromolecules are detectable enzymes and said avidin and said biotinylated macromolecules are present at a weight ratio in the range from 1:1 to 16:1; and

localizing the marker by reacting the detectable enzyme with substrate and observing the reaction.

4,684,610

PROCESS FOR CONVERTING 1,2-SATURATED STEROIDS TO 1,2-DEHYDRO STEROIDS

Timothy W. Evans, Park Township, Three Rivers County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 475,437, Mar. 15, 1983, abandoned. This application Apr. 17, 1985, Ser. No. 724,036
Int. Cl.[4] C12P *33/02*
U.S. Cl. 435—61 **9 Claims**

1. A process for converting a 1,2-saturated steroid to a 1,2-dehydro steroid which comprises contacting the 1,2-saturated steroid with *Arthrobacter simplex* or *Bacterium cyclooxydans* in the presence of an exogenous electron carrier, a water-immiscible aromatic hydrocarbon solvent where the oxygen concentration is maintained below the minimum oxygen concentration required for combustion or where the reaction is performed below the flash point of the mixture with the proviso that the 1,2-saturated steroid has a solubility in the water-immiscible aromatic hydrocarbon solvent of greater than 5 g/liter.

4,684,611

PROCESS FOR THE IN-VITRO TRANSFORMATION OF PLANT PROTOPLASTS WITH PLASMID DNA

Robbert A. Schilperoort, Vincent van Goghlaan 40, 2343 RP Oegstgeest; Frans A. Krens, Scheveningen, and George J. Wullems, Warmond, all of Netherlands, assignors to Rijksuniversiteit Leiden, Leiden and Robbert Schilperoort, Oegstgeest, both of, Netherlands

Continuation of Ser. No. 462,322, Jan. 31, 1983, abandoned. This application Jul. 29, 1985, Ser. No. 760,145
Claims priority, application Netherlands, Feb. 11, 1982, 8200523
Int. Cl.[4] C12N *15/00, 5/00*
U.S. Cl. 435—172.3 **8 Claims**

1. A process for transforming genetic properties of higher plants or parts thereof by inserting into the DNA of these plants DNA of a plasmid that is foreign to these plants, characterized by initially incubating protoplasts of higher plants together with plasmid DNA in the presence of polyethylene glycol, calcium ions, and carrier DNA, subsequently, after a period of incubation, gradually increasing the calcium ion concentration in the incubation medium, and decreasing the polyethylene glycol concentration wherein said calcium ion

concentration is increased to 100–125 mmoles/l with a simultaneous decrease in said polyethylenCe glycol concentration to about 1–3% (weight/volume) separating the resulting aggregates, growing these further separately, and examining them for modification of their genetic properties.

4,684,612

PROCESS FOR REGENERATING SOYBEANS

John K. Hemphill, Cupertino, and Eric J. Eikenberry, Atherton, both of Calif., assignors to Sungene Technologies Corporation, Palo Alto, Calif.

Filed Jul. 27, 1984, Ser. No. 635,222

Int. Cl.[4] C12N *5/00, 5/02*

U.S. Cl. 435—240.5 **24 Claims**

1. A process for regenerating soybean plantlets from cell or tissue culture which comprises the steps of:

(a) culturing tissue obtained from the immature embryo of a soybean plant, *Glycine max*, on a first medium which comprises the MS mineral salts modified so that the concentration of iron (II) sulfate heptahydrate is 41.7 mg/l and the concentration of disodium EDTA is 55.9 mg/l, Nitsch's vitamins modified so that the concentration of thiamine is 0.9 mg/l, 100 mg/l myo-inositol, 2%–3% sucrose, and a hormone selected from the group consisting of (1) 0.5–10.0 mg/l 2,4-D, (2) a mixture of 1–3 mg/l IAA and 3–10 mg/l 2,4-D and (3) a mixture of 1–3 mg/l IAA, 3–10 mg/l 2,4-D and 0.0264–0.264 mg/l ABA to ensure callus and embryoid formation,

(b) subculturing said callus with embryoids on a second medium which comprises the MS mineral salts modified so that the concentration of iron (II) sulfate heptahydrate is 41.7 mg/l and the concentration of disodium EDTA is 55.9 mg/l, Nitsch's vitamins modified so that the concentration of thiamine is 0.9 mg/l, 100 mg/l myo-inositol, 2%–3% sucrose, and a hormone selected from the group consisting of (1) 3–5 mg/l 2,4-D, (2) a mixture of 1–3 mg/l IAA and 3–10 mg/l 2,4-D, (3) a mixture of 1.0–2.0 mg/l IAA and 0.5–1.0 mg/l t-zeatin, (4) a mixture of 1.0–2.0 mg/l IAA and 2.73–5.46 mg/l adenine sulfate, (5) a mixture of 100–1000 mg/l casein hydrolysate, 1.0–2.0 mg/l IAA, 0.5–1.0 mg/l t-zeatin, 0.0097–0.0606 mg/l picloram and 0.0264–1.32 mg/l ABA, and (6) a mixture of 3–5 mg/l 2,4-D, 1–3 mg/l IAA and 0.0264–0.264 mg/l ABA to ensure embroyid formation;

(c) subculturing said callus with mature embryoids on a third medium which comprises the MS mineral salts modified so that the concentration of iron (II) sulfate heptahydrate is 41.7 mg/l and the concentration of disodium EDTA is 55.9 mg/l, Nitsch's vitamins modified so that the thiamine concentration is 0.9 mg/l, 100 mg/l myo-inositol, 2%–3% sucrose and a hormone selected from the group consisting of (1) a mixture of 0.1–0.5 mg/l BA and 0.001–0.05 mg/l IBA, (2) a mixture of 1.0–3.0 mg/l IAA and 2.73–10.92 mg/l adenine sulfate, (3) a mixture of 0.1–0.5 mg/l BA, 0.001–0.05 mg/l IBA and 0.03464 mg/l GA_3, and (4) a mixture of 0.05 mg/l IAA, 0.05 mg/l BA and 0.03464 mg/l GA_3 to ensure shoot formation; and

(d) subculturing said callus with shoots on a fourth medium which comprises at least three of the following components: (1) the MS mineral salts modified so that the conconcentration of iron (II) sulfate heptahydrate is 41.7 mg/l and the concentration of disodium EDTA is 55.9 mg/l, (2) Nitsch's vitamins modified so that the thiamine concentration is 0.9 mg/l, 100 mg/l myo-inositol, (3) 1%–3% sucrose, and (4) a hormone selected from the group consisting of (i) 0.1–1.0 mg/l IAA and (ii) 0.1–1.0 mg/l IBA, with the proviso that components (1), (2) and (3) are always present.

4,684,613

DEVICE FOR CARRYING OUT WITHDRAWALS OF SAMPLES FROM SEMI-SOLID MEDIA

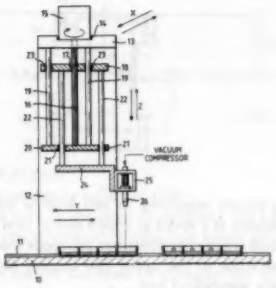
Genevieve C. Barrere; Marie-Hélène Beydon, both of Paris; Lionel Drugeault, Charenton, and Jean-Pierre Vasseur, Longjumeau, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

Filed Apr. 19, 1985, Ser. No. 724,889

Claims priority, application France, Apr. 19, 1984, 84 06203

Int. Cl.[4] C12M *1/20, 1/26*

U.S. Cl. 435—301 **5 Claims**



1. A device for automatically carrying out the withdrawal and deposition of core samples of semi-solid media, said device comprising:

(a) a carrier;

(b) three separate guide means extending in three mutually perpendicular directions and mounting said carrier and guiding said carrier for accurate reciprocable movement in said three mutually perpendicular directions in a controlled manner;

(c) a holder mounted on said carrier;

(d) at least one hollow punch mounted on said holder, said at least one punch defining, in its interior, a punch chamber having a lower bevelled cutting edge;

(e) a bore through said punch, communicating with said chamber, the diameter of said bore being less than the diameter of said chamber;

(f) a compressed air source;

(g) a vacuum generator;

(h) means selectively connecting said bore to said compressed air source or said vacuum generator; and

(i) control means governing the movement of said carrier and of said selecitve means, whereby the hollow punch may be raised from the bottom of the receptacle, and immediately thereafter carryout a horizontal shift in two mutually perpendicular directions, enabling air to penetrate under the core sample.

4,684,614

MIXING OR PUMPING APPARATUS FOR THE TREATMENT OF FLOWABLE THIN OR HIGHLY VISCOUS MEDIA

Premysl Krovak, and Miroslav Salvet, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation of Ser. No. 406,952, Aug. 10, 1982, abandoned. This application Jan. 3, 1986, Ser. No. 816,684

Claims priority, application Czechoslovakia, Aug. 10, 1981, 6013-81

Int. Cl.[4] C12M *1/02;* B01F *5/12, 23/90*

U.S. Cl. 435—316 **5 Claims**

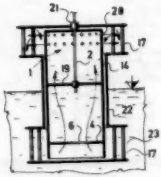
1. A mixing or pumping apparatus for liquid medium, comprising:

a container which contains a fluent medium which is to be mixed or pumped,

a hollow cylindrical rotor with a horizontal bottom,

said hollow cylindrical rotor being at least partly submerged under the level of the fluent medium in the container,

said horizontal bottom being provided with a central circular inlet opening for supply of the medium from said container to the interior of said rotor, said inlet opening being concentric with the longitudinal axis of said cylindrical rotor whereby when said rotor is rotated at a sufficiently high speed a strong suction is effected at said inlet opening,



driving means imparting to said hollow rotor a rotational movement at a speed at which due to centrifugal force the medium within the container proceeds from the lower end of the rotor to the upper end thereof and forms there a surface paraboloid and

means in the top of the rotor for the discharge of the medium through the top of said rotor above the surface of the fluent medium.

4,684,615

STABILIZED ISOENZYME CONTROL PRODUCTS

Michael K. Hoskins, Irvine, Calif., assignor to Ciba Corning Diagnostics Corp., Medfield, Mass.

Continuation of Ser. No. 501,213, Jun. 6, 1983, abandoned. This application Sep. 29, 1986, Ser. No. 913,117

Int. Cl.[4] G01N *31/00*

U.S. Cl. 436—16 **4 Claims**

1. A method of stabilizing an isoenzyme control reagent comprising adding to an aqueous solution containing the isoenzymes to be stabilized against disassociation or rearrangement of subunits a plexiform stabilizing means selected from the group consisting of reducing monosaccharide sugars and reducing disaccharide sugars, said plexiform stabilizing means present in the range of about 2% to 8% weight per volume.

4,684,616

METHODS FOR THE REMOVAL AND/OR PREVENTION OF BUILD-UP OF SLAG AND COMPOSITION FOR USE IN SAID METHODS

Patrick J. Trears, 81 Roselawn Road, Castleknock, County Dublin, Ireland

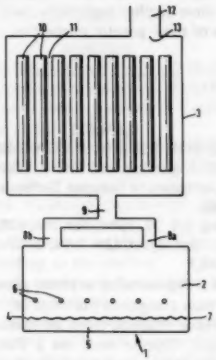
Filed Feb. 24, 1986, Ser. No. 833,532

Claims priority, application Ireland, Feb. 25, 1985, 465/85

Int. Cl.[4] C03B *40/02*

U.S. Cl. 501—49 **15 Claims**

1. A composition for use in the removal and/or prevention of build-up of slag on heat transfer surfaces in plant used in glass manufacture and other plant where raw materials similar to those employed in glass manufacture are used, which composition comprises borax in association with a carrier or diluent therefor and a minor proportion of a transition metal acetylacetonate.



4,684,617

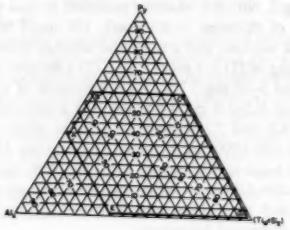
TITANIUM-ALUMINUM-PHOSPHORUS-SILICON-OXIDE MOLECULAR SIEVES

Brent M. T. Lok, New City; Bonita K. Marcus, Rye, and Edith M. Flanigen, White Plains, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Apr. 13, 1984, Ser. No. 600,179

Int. Cl.[4] B01J *27/14*; C01B *25/36*

U.S. Cl. 502—214 **38 Claims**



1. Crystalline molecular sieves having three-dimensional microporous framework structures of TiO_2, AlO_2, PO_2 and SiO_2 tetrahedral units having an empirical chemical composition on an anhydrous basis expressed by the formula:

$$mR: (Ti_wAl_xP_ySi_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(Ti_wAl_xP_ySi_z)O_2$ and has a value of zero (0) to about 0.3; and "w", "x", "y" and "z" represent the mole fractions of titanium, aluminum, phosphorus and silicon respectively, present as tetrahedral oxides, said mole fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of Tables A to F herein.

9. Process for preparing the crystalline molecular sieves of claim 1 having three-dimensional microporous framework structures wherein said process comprises providing a reaction mixture composition for an effective time at an effective temperature sufficient to produce the molecular sieves of claim 1,

said composition being expressed in terms of molar oxide ratios as follows:

$$(Ti_wAl_xP_ySi_z)O_2:bH_2O$$

wherein "R" is an organic templating agent: "a" is the amount of "R" and is an effective amount greater than zero to about 6: "b" has a value of from zero to 500; and "w", "x", "y" and "z" represent the mole fractions, respectively, of titanium, aluminum, phosphorus and silicon in the $(Ti_wAl_xP_ySi_z)O_2$ constituent, and each has a value of at least 0.01.

4,684,618

BIMETALLIC CATALYSTS FOR THE REACTION OF CARBON MONOXIDE AND HYDROGEN AND METHOD OF MAKING THE CATALYSTS

Henry C. Foley, East Norwalk, and Michael P. O'Toole, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 28, 1985, Ser. No. 791,648
Int. Cl.[4] B01J *21/04, 23/64*
U.S. Cl. 502—313 **2 Claims**

1. Catalyst for the reaction of synthesis gas containing hydrogen and carbon monoxide for selective production of oxygenates comprising a support of alumina which may contain up to about 5% of other oxides, molybdenum or tungsten in the range of 1 to 10 percent by weight deposited as the metal oxide on the surface area of the alumina support by chemisorption from solution and oxidation of molybdenum or tungsten carbonyl on the surface of said alumina and further comprising rhodium or ruthenium in the range 0.5 to 5 percent by weight deposited as the metal oxide by chemisorption from solution and oxidation of the chemisorbed carbonyl of rhodium or ruthenium over said molybdenum or tungsten oxide on the support.

4,684,619

PROCESS FOR MAKING A DEHYDROGENATION CATALYST HAVING IMPROVED MOISTURE STABILITY

Stanley E. Moore, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 856,320, Apr. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 703,628, Feb. 20, 1985, abandoned. This application Sep. 30, 1986, Ser. No. 913,429
Int. Cl.[4] B01J *23/78*
U.S. Cl. 502—330 **5 Claims**

1. In a process for making an iron oxide-containing dehydrogenation catalyst wherein an alkali metal carbonate is employed as a promoter, organic materials are employed as porosity control agents and the constituents are combined, formed into a particulate mass and calcined at temperatures sufficient to oxidize the organic materials and convert the carbonate to an oxide, the improvement which comprises conducting the calcining process in two steps, wherein the particulate mass is heated (1) to a temperature in the range of from 250° to about 600° C. for a time of from about 30 minutes to about 4 hours which is sufficient to oxidize said organic materials and thereafter (2) to a temperature of from 700° to 800° C. for a time of from about 10 to about 60 minutes which is sufficient to convert substantially all carbonates present to the corresponding oxides.

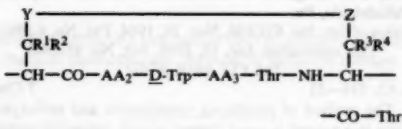
4,684,620

CYCLIC POLYPEPTIDES HAVING MU-RECEPTOR SPECIFICITY

Victor J. Hruby, and John T. Pelton, both of Tucson, Ariz., assignors to Gibson-Stephens Neuropharmaceuticals, Inc., Tucson, Ariz.

Filed Sep. 4, 1984, Ser. No. 647,184
Int. Cl.[4] A61K *37/43;* **C07K** *7/12, 7/06*
U.S. Cl. 514—11 **16 Claims**

1. A polypeptide having the formula:



wherein
X is $CONH_2$ or CH_2OH;
Y and Z are independently sulfur or CH_2;
R^1 and R^2, which may be the same or different, are hydrogen, methyl, ethyl, cyclopentamethylene, or a lower alkyl group having five or less carbon atoms;
R^3 and R^4, which may be the same or different, are hydrogen, methyl, ethyl, cyclopentamethylene, or a lower alkyl group having five or less carbon atoms, provided, however, that R^1, R^2, R^3, and R^4 may not all be hydrogen;
AA_1 is Phe, D-Phe, phenyl-Gly, D-phenyl-Gly, Tyr, D-Tyr, L-1-Naphthylalanine, D-1-Naphthylalanine, or D-Phe(4-Me);
AA2 is Tyr, Phe, Tyr(OMe), Phe(4-Me), Tyr(OEt), or Phe(4-Et); and
AA_3 is Lys, Arg, Orn or homo-Arg.

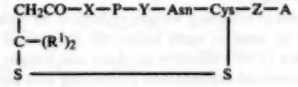
4,684,621

METHODS OF PRODUCING VASODILATION OR ANTIOXYTOCIC ACTIVITY

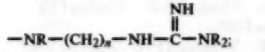
James F. Callahan, Philadelphia; William F. Huffman, Malvern; Michael L. Moore, Media, and Nelson C. Yim, Ambler, all of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Division of Ser. No. 673,829, Nov. 21, 1984, Pat. No. 4,604,378. This application Apr. 16, 1986, Ser. No. 852,870
Int. Cl.[4] A61K *37/34*
U.S. Cl. 514—11 **3 Claims**

1. The method of producing vasodilation or antioxytocic activity in a patient in need thereof which comprises administering parenterally or intranasally to said patient an effective therefor, nontoxic quantity of a compound having the formula:



in which:
A is $-NR-(CH_2)_n-NR_2$ or



P is Phe, Ile, Phe(4'-Alk), Tyr or Tyr(alk);
X is a D or L isomer of Val, Nva, Leu, Ile, Pba, Phe, Phe(4'-Alk), Trp, Nle, Cha, Abu, Met, Chg, Tyr or Tyr(Alk);
Y is Val, Ile, Abu, Ala, Chg, Gln, Lys, Cha, Thr, Nle, Phe, Leu or Gly;

Z is Gly, Sar, a single bond or a D or L isomer of Pro, Δ^3-Pro, Ala or N-Me-Ala;

R^1 is, each, hydrogen or methyl;

n is an integer from 2–8;

R is, each, hydrogen or methyl; and Alk is a lower alkyl of 1–4 carbons or a pharmaceutically acceptable salt thereof.

4,684,622

COMPOSITIONS AND METHODS FOR PRODUCING VASODILATION AND ANTIOXYTOCIC ACTIVITY

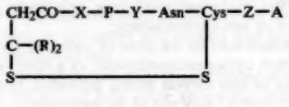
Fadia E. Ali, Cherry Hill, N.J., and William F. Huffman, Malvern, Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Division of Ser. No. 673,828, Nov. 21, 1984, Pat. No. 4,599,324. This application Apr. 18, 1986, Ser. No. 853,503

Int. Cl.[4] A61K *37/02*

U.S. Cl. 514—11 **7 Claims**

5. The method of producing vasodilation and antioxytocic activity in a patient in need thereof which comprises administering parenterally or intranasally to said patient a nontoxic, effective therefor quantity of a compound having the formula:



in which:

P is Phe, Ile, Phe(4'-Alk), Tyr or Tyr(Alk);

X is a D or L isomer of Val, Nva, Leu, Ile, Pba, Phe, Phe(4'-Alk), Trp, Nle, Cha, Abu, Met, Chg, Tyr or Tyr(Alk);

Y is Val, Ile, Abu, Ala, Chg, Gln, Lys, Cha, Thr, Nle, Phe, Leu or Gly;

Z is a D or L isomer of Arg, Harg, Leu, Lys or Orn;

A is Gly(NH_2), Gly, Gly(NH-Alk), OH, NH_2 or NHAlk; and

R is, each, hydrogen or methyl, and each of the Alk groups is a lower alkyl of 1–4 carbons, or a pharmaceutically acceptable salt thereof.

4,684,623

USE OF TUMOR NECROSIS FACTOR AS A WEIGHT REGULATOR

James W. Larrick, Woodside; Gordon M. Ringold, Palo Alto; David F. Mark, Danville; Leo S. Lin, Walnut Creek, and Frank M. Torti, Palo Alto, all of Calif., assignors to The Board of Trustees of the Cetus Corporation, Emeryville and Leland Stanford Junior University, Stanford, both of, Calif.

Continuation-in-part of Ser. No. 730,367, May 2, 1985. This application Nov. 26, 1985, Ser. No. 801,989

Int. Cl.[4] A61K *37/02, 39/00*

U.S. Cl. 514—12 **12 Claims**

1. A method of effecting weight reduction by administering to a subject in need of such treatment an amount of tumor necrosis factor (TNF) effective to cause said weight reduction or a pharmaceutical composition containing said amount,

wherein said TNF is the mTNF having the amino acid sequence shown in FIG. 1 or a mutein thereof,

wherein said mutein is selected from the group consisting of ∇1TNF, ∇2-, ∇3- . . . through ∇10TNF;

ser_{69}TNF, ∇1ser_{69}TNF, ∇2ser_{69}TNF . . . through ∇10ser_{69}TNF;

ser_{101}TNF, ∇1ser_{101}TFN, ∇2ser_{101}TNF . . . through ∇10ser_{101}TNF;

$ser_{69}ser_{101}$TNF, ∇1$ser_{69}ser_{101}$TNF, ∇2$ser_{69}ser_{101}$TNF . . . through ∇10$ser_{69}ser_{101}$TNF; and

a mutein having the sequence of amino acids 21–157 of FIG. 1 with the N-terminal sequence Val-Arg-Ser-Arg-Thr-Pro-Ser-Asp-Lys-Pro-Val-Ala-Val-Ser-Val-Ala-Asn-Pro.

4,684,624

METHOD OF TREATING CEREBRAL ISCHEMIA

Yoshio Hosobuchi, 116 Kinross Dr., San Rafael, Calif. 94901; Nancy M. Lee, 1830 Funston Ave.; Horace H. Loh, 54 Mendosa, both of San Francisco, Calif. 94116, and Jaw-Kang Chang, 90 Curtis Ct., San Carlos, Calif. 94070, assignors to Yoshio Hosobuchi, San Rafael; Nancy M. Lee; Horace H. Loh, both of San Francisco and Jaw-Kang Chang, San Carlos, all of, Calif.

Continuation of Ser. No. 564,741, Dec. 22, 1983, abandoned. This application May 20, 1985, Ser. No. 735,948

Int. Cl.[4] A61K *37/02*

U.S. Cl. 514—15 **8 Claims**

1. A method of treating a patient suffering from cerebral ischemia comprising:

administering a therapeutically effective amount of an opioid peptide to the patient, the opioid peptide having the amino acid sequence TYR-GLU-GLY-PHE-LEU-ARG-ARG-AA^8-AA^9-AA^{10}-$(AA^{11})_w$, wherein AA^8 is TYR, ILE, LEU OR LYS, AA^9 is ARG or PRO, AA^{10} is PRO or LYS, AA^{11} is LYS, LYS-LEU or LYS-LEU-LYS, w is 0 or 1, and said opioid peptide is in acid or amidated form.

4,684,625

METHOD FOR ENHANCING THE ANTI-INFECTIVE ACTIVITY OF MURAMYLDIPEPTIDE DERIVATIVES

Deborah A. Eppstein, Palo Alto; Elizabeth Fraser-Smith, Los Altos, and Thomas R. Matthews, Los Gatos, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

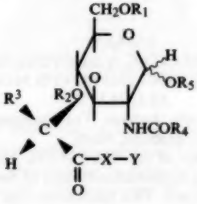
Continuation-in-part of Ser. No. 396,213, Jul. 8, 1982, Pat. No. 4,522,811. This application Apr. 19, 1985, Ser. No. 725,037

The portion of the term of this patent subsequent to Jun. 11, 2002, has been disclaimed.

Int. Cl.[4] C07K *5/06;* **A61K** *9/42*

U.S. Cl. 514—19 **26 Claims**

1. A method for enhancing the anti-infective activity of a muramyldipeptide derivative, which method comprises parenterally co-administering an effective amount of a muramyldipeptide derivative ("MDP derivative") and an anti-infective activity enhancing amount of liposomes to a bird or mammal wherein said MDP derivative is a compound of formula I or a pharmaceutically acceptable salt thereof:



(I)

wherein

R_1 is hydrogen or acyl of 1–22 carbon atoms;

R_2 is hydrogen or acyl of 1–22 carbon atoms;

R_3 is hydrogen or lower alkyl of 1–4 carbon atoms;

R_4 is alkyl of 1–22 carbon atoms, phenyl, phenyl-lower alkyl containing a total of 6–15 carbon atoms, where alkyl, phenyl, and phenyl-lower alkyl may be substituted with one or more of the following: —OH, —OR_6, —OC(O)R_6, —C(O)R_6, —NH_2, —NHR_6, or —$N(R_6)_2$, where R_6 is alkyl of 1–4 carbon atoms; p1 R_5 is hydrogen, alkyl of 1–22 carbon atoms, phenyl, phenyl-lower alkyl containing a total of 6–15 carbon atoms, where alkyl, phenyl, and phenyl-lower alkyl may be substituted with one or more of the following: —OH, —OR_6, —OC(O)R_6, —C(O)R_6, —NH_2, —NHR_6, or —$N(R_6)_2$, where R_6 is alkyl of 1–4 carbon atoms;

X is an aminoacyl moiety selected from the group consisting of

L-alanyl,	L-tryptophanyl,
L-valyl,	L-lysyl,
L-leucyl,	L-ornithyl,
L-isoleucyl,	L-arginyl,
L-α-aminobutyryl,	L-histidyl,
L-seryl,	L-glutamyl,
L-threonyl,	L-glutaminyl,
L-methionyl,	L-aspartyl,
L-cysteinyl,	L-asparaginyl,
L-phenylalanyl,	L-prolyl,
L-tyrosyl,	L-hydroxyprolyl; and

Y is D-glutamic or D-aspartic acid, or an (alkyl of 1–22 carbon atoms)ester thereof, a di(alkyl of 1–22 carbon atoms)ester thereof, an amide thereof, an (alkyl of 1–4 carbon atoms)amide thereof, a di(alkyl of 1–4 carbon atoms)amide thereof, or an (alkyl of 1–22 carbon atoms)ester-(alkyl of 1–4 carbon atoms)amide thereof;

with the proviso that the MDP derivative is not encapsulated in or physically attached to the liposomes.

4,684,626

MOENOMYCIN A DERIVATIVES AND THEIR USE AS ANTIBIOTICS

Peter Welzel; Franz Kunisch, both of Bochum; Hermann Stein, Gladbeck; Aranka Hiltmann née Ponty, and Frithjof Kruggel, both of Bochum, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

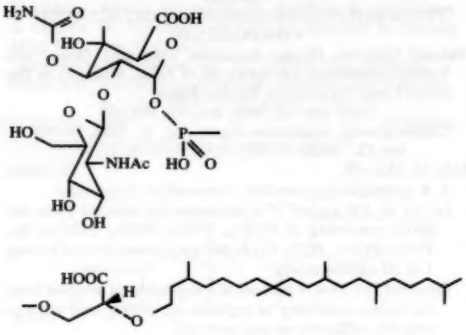
Filed May 18, 1984, Ser. No. 611,567

Claims priority, application Fed. Rep. of Germany, May 21, 1983, 3318594

Int. Cl.⁴ A61K *31/71;* **C07H** *15/04*

U.S. Cl. 514—25 **4 Claims**

1. A compound of the formula



3. A method of treating microbial diseases comprising the administration to a host of a therapeutically effective amount of the compound of claim 1.

4,684,627

TREATMENT OF CANCER WITH PHLORIZIN AND ITS DERIVATIVES

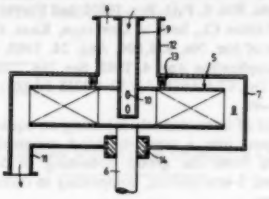
Harry H. LeVeen, 321 Confederate Cir., Charleston, S.C. 29407; Eric G. LeVeen, 358 Summit Ave., Mount Vernon, N.Y. 10552, and Robert F. LeVeen, 312 Lombard St., Philadelphia, Pa. 19147

Continuation-in-part of Ser. No. 300,136, Sep. 8, 1981, abandoned. This application Aug. 13, 1984, Ser. No. 640,170

Int. Cl.⁴ A61K *31/70*

U.S. Cl. 514—25 **4 Claims**

1. A method for the treatment of lung cancer in humans which comprises administering lonidamine and one or more compounds selected from the group consisting of phlorizin, phlorizin glucoronide and 4-deoxyphoretin-2-D-glucoside in an amount effective to inhibit glucose transport in the cancer



cells while subjecting said cancer cells to additional therapy in the form of chemotherapy, thermal or radiation therapy.

4,684,628

PHARMACEUTICAL COMPOSITION CONTAINING PURE SAN-MAI-SEN

Yaguang Liu, 67-08, 168th St., Flushing, N.Y. 11365

Filed May 3, 1985, Ser. No. 730,365

Int. Cl.⁴ A61K *31/705, 31/045*

U.S. Cl. 514—26 **2 Claims**

1. A pharmaceutical composition for treatment of cardiovascular disease and increasing immunity, comprising, in weight percent, ginsenoside, 25–60%; ophiopogonin, 25–60%; and sesquicarene/chamigrene, 5–50%.

4,684,629

3'-DEAMINO-3'-HYDROXY-4'-DEOXY-4'-AMINO DOXORUBICIN AND RELATED DAUNORUBICIN

Alberto Bargiotti; Michele Caruso; Antonino Suarato; Sergio Penco, all of Milan, and Fernando Giuliani, Cassina de'Pecchi, all of Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy

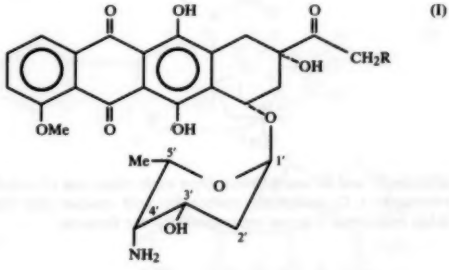
Filed Mar. 24, 1986, Ser. No. 843,264

Claims priority, application United Kingdom, Mar. 28, 1985, 8508079

Int. Cl.⁴ A61K *31/70;* **C07H** *15/24*

U.S. Cl. 514—34 **6 Claims**

1. An anthracycline glycoside of the general formula (I):



(I)

wherein R is hydrogen or hydroxy, and pharmaceutically acceptable salts thereof.

6. A method of inhibiting the growth of P388 leukemia tumors comprising administering, to a mammal, afflicted with said tumor a therapeutically effective amount of the compound of claim 1.

4,684,630

METHOD OF PARENTERALLY DELIVERING DRUGS AND RELATED COMPOSITIONS

Arnold J. Repta, Rte. 6, P.O. Box 100N, and Parviz Mojaverian, 105-WW Waldon Ct., both of Lawrence, Kans. 66044

Continuation of Ser. No. 526,104, Aug. 24, 1983, abandoned. This application Apr. 4, 1985, Ser. No. 720,035

Int. Cl.[4] A61K *31/70*; C07H *17/00*

U.S. Cl. 514—49 2 Claims

1. A method of intravenously injecting an aqueous unstable anticancer agent into a warm-blooded mammal, the agent being selected from the group consisting of 5-azacytosine arabinoside and 5-azacytidine, comprising in combination the following steps:

(a) aqueously diluting a stable, anhydrous organic solution to form an organic-aqueous solution, the organic solution consisting of the agent and a highly water soluble organic solvent selected from the group consisting of dimethylsulfoxide and dimethylacetamide, the organic-aqueous solution having the organic solvent present in a concentration of less than about 5% based on the total weight of the organic-aqueous solution, the organic-aqueous solution being physiologically suitable for intravenous injection into the warm-blooded mammal, the agent being present in the organic-aqueous solution in an effective dosage concentration per unit volume of approximately 1 mg./ml.; and

(b) intravenously injecting the organic-aqueous solution into the warm-blooded mammal;

the dilution step occuring immediately prior to the intravenous injection step.

4,684,631

NOVEL 5-FLUORO-2-DEOXYURIDINE DERIVATIVES AND SALTS THEREOF, PROCESS FOR PRODUCING THE SAME, AND ANTITUMOR AGENTS CONTAINING THE SAME

Takako Hori; Isao Myokan, and Shinji Miyabara, all of Toyama, Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan

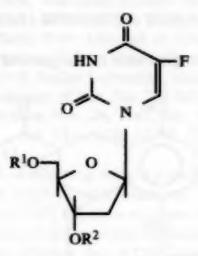
Filed Sep. 30, 1985, Ser. No. 781,988

Claims priority, application Japan, Oct. 9, 1984, 59-210525; Jan. 23, 1985, 60-9192

Int. Cl.[4] C07H *15/12*; A61K *31/70*

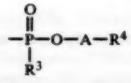
U.S. Cl. 514—51 16 Claims

1. A 5-fluoro-2′-deoxyuridine derivative represented by the general formula [I] or a salt thereof:



[I]

wherein R^1 and R^2 are different from each other, one of which represents a C_{1-30}aliphatic carboxylic acid residue and the other represents a group represented by the formula,



in which R^3 represents an oxido group, A represents a C_{1-5}-alkylene group and R^4 represents a tri-C_{1-4}alkylammonio, pyridinio, pyridazinio, pyrimidinio, pyrazinio, 2H-imidazolio, 3H-imidazolio, 2H-pyrazolio, 1-methyl-piperidinio, 4-methylmorpholinio or 2H-1,2,4-triazol-1-io, which may be substituted by at least one substituent selected from the group consisting of hydroxyl, C_{1-4}alkoxy, acetyloxy, propionyloxy, C_{1-4}alkyl and di-C_{1-4}alkyl-amino groups.

4,684,632

FORMULATION WITH SPECIAL 1,2-DIACYLGLYCERO-3-PHOSPHOCHOLINES FOR THE TREATMENT OF GASTROINTESTINAL DISORDERS

Volker Schulz, Cologne; Sigurd Leyck, Pulheim; Manfred Dürr, Pulheim-Dansweiler; Miklos Ghyczy, Cologne; Armin Wendel, Cologne, and Jörg Hager, Cologne, Fed. Rep. of Germany, assignors to A. Nattermann & CIE. GmbH, Cologne, Fed. Rep. of Germany

Filed Dec. 21, 1984, Ser. No. 684,685

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1983, 3346525

Int. Cl.[4] A61K *31/685*

U.S. Cl. 514—78 17 Claims

1. A pharmaceutical formulation for the treatment of gastrointestinal disorders which occur in association with mucosal erosions and ulcerations in the stomach and duodenum, comprising as the active component an effective gastrointestinal disorder alleviating amount of a 1,2-diacylglycero-3-phosphocholine in which 75–86% by weight of the acyl radicals are a mixture of fatty acid radicals comprising

10–14% by weight of palmitic acid

3–5% by weight of stearic acid

8–12% by weight of oleic acid

62–68% by weight of linoleic acid

4–6% by weight of linolenic acid.

4,684,633

PHOSPHOLIPID-EMULSIFIED PROSTAGLANDIN COMPOSITION

Takashi Imagawa, Hyogo; Kazumasa Yokoyama, Osaka, and Yutaka Mizushima, Kanagawa, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan

Filed Jan. 14, 1985, Ser. No. 691,023

Claims priority, application Japan, Jan. 12, 1984, 59-3858

Int. Cl.[4] A61K *31/685, 31/215, 31/19, 31/557*

U.S. Cl. 514—78 15 Claims

1. A prostaglandin emulsion composition comprising

(a) 0.2 to 100 μg/ml of a prostaglandin selected from the group consisting of $PGF_{2\alpha}$, PGE_2, PGD_2, PGFHd 1α, PGE_1, PGA_1, PGI_2, PGB_1 and alkyl esters thereof having 1 to 30 carbon atoms;

(b) about 5 to 50 w/v percent of a vegetable oil selected from the group consisting of soybean oil, cotton seed oil, sesame oil, safflower oil and corn oil;

(c) a phosphatidylethanolamine-free phospholipid consisting mostly of phosphatidylcholines being about 1 to about 50 parts per 100 parts of said oil (b); and

(d) a balance of water;

and having an average particle diameter of 1 μm or less.

4,684,634

AGRICULTURAL AND HORTICULTURAL FUNGICIDAL COMPOSITION

Tadashi Ooishi, Toyonaka, Japan, assignor to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 653,023, Sep. 21, 1984, abandoned. This application Dec. 18, 1985, Ser. No. 809,856

Claims priority, application Japan, Nov. 1, 1983, 58-206225

Int. Cl.[4] A01N *57/10*

U.S. Cl. 514—144 3 Claims

1. An agricultural and horticultural fungicidal composition containing as active ingredients a fungicidally effective amount

of tolclofos-methyl and a fungicidally effective amount of an N,N'-ethylenebis(dithiocarbamate) fungicide selected from the group consisting of manganese ethylenebis(dithiocarbamate), zinc ethylenebis(dithiocarbamate), and zinc-manganese ethylenebis(dithiocarbamate) complex, wherein the mixing ratio of tolclofos-methyl to the N,N'-ethylenebis(dithiocarbamate) fungicide is within a range of 10:1 to 1:10 parts by weight.

4,684,635

COMPOSITIONS AND METHODS FOR INHIBITING THE ACTION OF ANDROGENS

Norman Orentreich, 140 E. 72, New York, N.Y. 10021, and Jonathan R. Matias, Richmond Hill, N.Y., assignors to Norman Orentreich, New York, N.Y.

Continuation of Ser. No. 609,152, May 11, 1984, abandoned. This application Mar. 27, 1986, Ser. No. 846,498

Int. Cl.[4] A61K *31/56*

U.S. Cl. 514—170 **12 Claims**

1. A topical composition for the treatment of sebaceous gland hypertrophy and hirsutism comprising therapeutically and synergistically effective amounts of (a) an inhibitor of the conversion of testosterone to dihydrotestosterone by the 5α-reductase enzyme and (b) a blocking agent which blocks the binding of dihydrotestosterone to receptor protein in cell cytoplasm and a pharmaceutically and dermatologically acceptable vehicle for said inhibitor and said blocking agent.

4,684,636

ANTIANDROGENIC SULFONYLSTEROIDOPYRAZOLES AND PROCESSES FOR PREPARATION METHOD OF USE AND COMPOSITIONS THEREOF

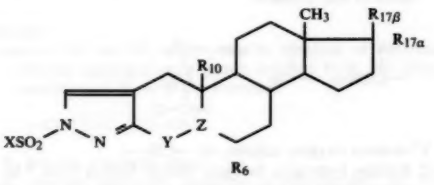
Robert G. Christiansen, Schodack; Malcolm R. Bell, East Greenbush; John L. Herrmann, Jr., Kinderhook, and Chester J. Opalka, Jr., Schodack, all of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 748,378, Jun. 24, 1985, abandoned. This application Apr. 8, 1986, Ser. No. 849,582

Int. Cl.[4] A61K *31/58*; C07J *21/00*

U.S. Cl. 514—176 **19 Claims**

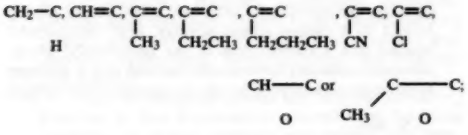
1. A compound having the structural formula



wherein

X is CH_3, CH_3CH_2, $CH_3CH_2CH_2$ or $ClCh_2$;

Y-Z is

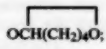


R_6 is H or CH_3 when Y-Z is CH=C or H when Y-Z is other than CH=C;

R_{10} is H or CH_3;

$R_{17\alpha}$ taken alone is H, C_3, CH_2CH_3, CH=CH_2, C=CH or C=CBr;

$R_{17\beta}$ taken alone is OH, $OCOCHCl_2$, $OCOCF_3$, OCH_3, OCH_2SCH_3, OCH_2SOCH_3, $OCH_2SO_2CH_3$ or



and

$R_{17\alpha}$ taken together with $R_{17\beta}$ is OCh_2CH_2O.

4,684,637

METHOD OF DECREASING RATE OF HEME METABOLISM

Attallah Kappas, Rye, and George Drummond, New York, both of N.Y., assignors to The Rockefeller University, New York, N.Y.

Continuation of Ser. No. 397,230, Jul. 12, 1982, abandoned, and a continuation-in-part of Ser. No. 285,373, Jul. 15, 1981, abandoned. This application Aug. 19, 1985, Ser. No. 768,163

Int. Cl.[4] A61K *31/555*

U.S. Cl. 514—185 **32 Claims**

1. A method of decreasing the rate of metabolism of heme in mammals in need of such treatment by administering to the mammal an amount of Sn-protoporphyrin or Cr-protoporphyrin which is effective to decrease said rate.

11. A pharmaceutical composition containing 100 to 2500 μmol of Sn-protoporphyrin or Cr-protoporphyrin per liter of non-toxic, parenteral buffered isotonic aqueous solution at pH 7 to 8.

4,684,638

METAL COMPLEXES OF BIS-INDOLE COMPOUNDS AND AQUEOUS PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Géza Takácsi Nagy; Gábor Szepesi; Maria Gazdag; Zsófia Pappnée Sziklay, and Kalmán Burger, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

Filed Oct. 1, 1985, Ser. No. 782,492

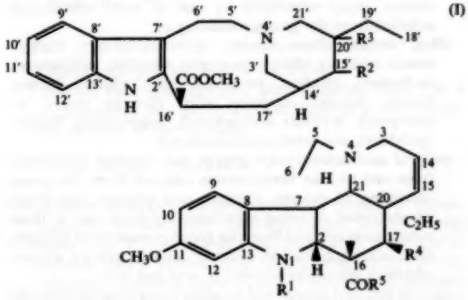
Claims priority, application Hungary, Oct. 16, 1984, 3861

Int. Cl.[4] A61K *31/475*; C07D *519/04*

U.S. Cl. 514—185 **9 Claims**

7. A stable, injectable, antineoplastic pharmaceutical composition which comprises:

(a) a pharmaceutically effective amount of a complex formed in aqueous solution at a pH of 3 to 6 between a bivalent metal ion selected from the group consisting of zinc, calcium, magnesium, cobalt, nickel and iron; and a bis-indole alkaloid of the Formula (I)



(I)

wherein

R^1 is methyl,

R^2 is hydrogen,

R^3 is hydroxy, or

R^2 and R^3 together form a valence bond,
R^4 is hydroxy or acetoxy, and
R^5 is methoxy or amino; or
R^1 is formyl,
R^2 is hydrogen,
R^3 is hydroxy, or
R^2 and R^3 together form an epoxy group.
R^4 is hydrogen or acetoxy, and
R^5 is methoxy; or a pharmaceutically acceptable acid addition salt thereof; wherein the molar ratio of the bis-indole alkaloid to the bivalent metal ion is at least 1:1;

(b) a buffer capable of maintaining the pH of the pharmaceutical composition between 3 and 6; and

(c) a pharmaceutically acceptable inert carrier suitable for an injectable composition.

4,684,639

ANTIBACTERIAL PENICILLINS AND CEPHALOSPORINS

George Burton, Carshalton, and Desmond J. Best, Southwater, both of England, assignors to Beecham Group, England

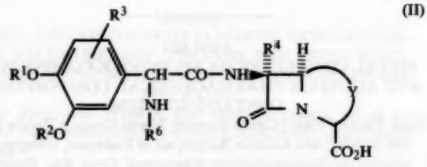
Filed Jul. 5, 1984, Ser. No. 627,772

Claims priority, application United Kingdom, Jul. 7, 1983, 8318374; Jan. 19, 1984, 8401443

Int. Cl.[4] **A61K** *31/43, 31/495, 31/545;* **C07D** *499/50, 499/54, 501/24*

U.S. Cl. 514—194 **31 Claims**

1. A compound of the formula (II)



(II)

or a pharmaceutically acceptable salt or in vivo hydrolysable ester thereof;

wherein

each of R^1 and R^2, which may be identical or different, denotes hydrogen or a group selected from the group consisting of those of the formulae

$$—COR^5 \text{ and } —CO—OR^5;$$

R_3 denotes a halogen atom;

R^4 denotes hydrogen, methoxy, hydroxymethyl, or formamido;

R^5 denotes an unsubstituted hydrocarbon group or a hydrocarbon group substituted by one or more substituents selected from the group consisting of:

alkyl, amino, alkanoylamino, monoalkylamino, dialkylamino, hydroxy, alkoxy, mercapto, alkylthio, sulphamoyl, carbamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, carboxy, carboxy salts, carboxy esters, alkanoyloxy, arylthio, arylcarbonyl, heterocyclyl, heterocyclylthio, and heterocyclylcarbonyl;

each of said heterocyclyl groups and moieties containing from one to four hetero-atoms selected from the group consisting of oxygen, nitrogen and sulphur, and being unsubstituted or being substituted by from one to three substituents selected from the group consisting of halogen, alkyl, alkoxy, haloalkyl, hydroxy, amino, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, aryl and oxo;

each of said aryl groups and moieties being selected from the group consisting of unsubstituted phenyl, unsubstituted naphthyl, substituted phenyl, and substituted naphthyl, wherein the substituents for said substituted phenyl and naphthyl are from one to five substituents selected from the group consisting of halogen, alkyl, phenyl, alkoxy, haloalkyl, hydroxy, amino, nitro, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, alkylcarbonyloxy and alkylcarbonyl;

each of said alkyl groups and alkyl moieties having from 1 to 6 carbon atoms;

R^6 denotes hydrogen or a group selected from the group consisting of those of the formulae

$$—COR^7 \text{ and } 'CO—N(R^7)R^8;$$

R^7 denotes an unsubstituted hydrocarbon group, an unsubstituted heterocyclic group, a substituted hydrocarbon group, or a substituted heterocyclic group, wherein the substituents for the said hydrocarbon and heterocyclic groups are one or more substituents selected from the group consisting of:

alkyl, amino, alkanoylamino, monoalkylamino, dialkylamino, hydroxy, alkoxy, mercapto, alkylthio, sulphamoyl, carbamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, carboxy, carboxy salts, carboxy esters, alkanoyloxy, alkylcarbonyl, arylthio, arylcarbonyl, arylalkoxy, heterocyclyl, heterocyclylthio, and heterocyclylcarbonyl;

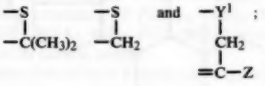
each of said heterocyclyl groups and moieties containing from one to four hetero-atoms selected from the group consisting of oxygen, nitrogen and sulphur, and being unsubstituted or being substituted by from one to three substituents selected from the group consisting of halogen, alkyl, alkoxy, haloalkyl, hydroxy, amino, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, aryl and oxo;

each of said aryl groups and moieties being selected from the group consisting of unsubstituted phenyl, unsubstituted napthyl, substituted phenyl, and substituted naphthyl, wherein the substituents for said substituted phenyl and naphthyl are from one to five substituents selected from the group consisting of halogen, alkyl, phenyl, alkoxy, haloalkyl, hydroxy, amino, nitro, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, alkylcarbonyloxy and alkylcarbonyl;

each of said alkyl groups and moieties having from 1 to 6 carbon atoms;

R^8 denotes hydrogen or alkyl having from 1 to 6 carbon atoms;

Y denotes a grouping selected from the group consisting of those of the formulae



Y^1 denotes oxygen, sulphur, or $—CH_2—$;

Z denotes hydrogen, halogen, alkoxy having from 1 to 4 carbon atoms, or a group selected from the group consisting of those of the formulae

$$—CH_2—Q \text{ and } —CH=CH—Q;$$

Q denotes hydrogen, halogen, hydroxy, mercapto, cyano, carboxy, carbamoyloxy, carboxylic ester, alkoxy having from 1 to 4 carbon atoms, acyloxy, aryl, heterocyclyl bonded thru a carbon atom of the heterocyclyl group, nitrogen-containing heterocyclyl bonded thru a nitrogen atom of the heterocyclyl group, or a group of the formula

$$—S—Het;$$

said carbon-bonded heterocyclyl group containing from one to four hetero-atoms selected from the group consisting of oxygen, nitrogen and sulphur, and being unsubstituted or being substituted by from one to three substituents selected from halogen, alkyl, alkoxy, haloalkyl, hydroxy,

amino, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, aryl and oxo;

said nitrogen-bonded heterocyclyl group containing from one to four heteroatoms selected from the group consisting of nitrogen, oxygen and sulphur, and being unsubstituted or substituted by one or two substituents selected from the group consisting of alkyl, alkoxy, hydroxyalkyl, alkenyl, alkoxyalkyl, carboxyalkyl, alkylsulphonyl, sulphonylalkyl, carbamoylmethyl, carbamoyl, trifluoromethyl, hydroxy, halogen, oxo, dialkylaminoalkyl, and aminoalkyl;

each of said aryl groups and moieties being selected from the group consisting of unsubstituted phenyl, unsubstituted naphthyl, substituted phenyl, and substituted naphthyl, wherein the substituents for said substituted phenyl and naphthyl are from one to five substituents selected from the group consisting of halogen, alkyl, phenyl, alkoxy, haloalkyl, hydroxy, amino, nitro, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, alkylcarbonyloxy and alkylcarbonyl;

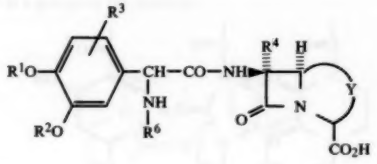
each of said alkyl groups and moieties having from 1 to 6 carbon atoms;

Het denotes a heterocyclyl ring having 5- or 6-ring atoms, from 1 to 4, of said ring atoms being selected from the group consisting of nitrogen, oxygen and sulphur, and said ring being unsubstituted or substituted by one or two substituents selected from the group consisting of:

alkyl, alkoxy, hydroxyalkyl, alkenyl, alkoxyalkyl, carboxyalkyl, sulphonylalkyl, carbamoylalkyl, trifluoromethyl, hydroxy, halogen, oxo, aminoalkyl, substituted-aminoalkyl, and alkylsulphonic acid;

or said ring being fused to another heterocyclic or carbocyclic ring.

12. A pharmaceutical composition useful for treating bacterial infections in humans and animals which comprises an antibacterially effective amount of a compound of the formula (II):



(II)

wherein

each of R^1 and R^2, which may be identical or different, denotes hydrogen or a group selected from the group consisting of those of the formulae

$-COR^5$ and $-CO-OR^5$;

R_3 denotes a halogen atom;

R^4 denotes hydrogen, methoxy, hydroxymethyl, or formamido;

R^5 denotes an unsubstituted hydrocarbon group or a hydrocarbon group substituted by one or more substituents selected from the group consisting of alkyl, amino, alkanoylamino, monoalkylamino, dialkylamino, hydroxy, alkoxy, mercapto, alkylthio, sulphamoyl, carbamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, carboxy, carboxy salts, carboxy esters, alkanoyloxy, arylthio, arylcarbonyl, heterocyclyl, heterocyclylthio, and heterocyclylcarbonyl;

each of said heterocyclyl groups and moieties containing from one to four hetero-atoms selected from the group consisting of oxygen, nitrogen and sulphur, and being unsubstituted or being substituted by from one to three substituents selected from the group consisting of halogen, alkyl, alkoxy, haloalkyl, hydroxy, amino, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, aryl and oxo;

each of said aryl groups and moieties being selected from the group consisting of unsubstituted phenyl, unsubstituted naphthyl, substituted phenyl, and substituted naphthyl, wherein the substituents for said substituted phenyl and naphthyl are from one to five substituents selected from the group consisting of halogen, alkyl, phenyl, alkoxy, haloalkyl, hydroxy, amino, nitro, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, alkylcarbonyloxy and alkylcarbonyl;

each of said alkyl groups and moieties having from 1 to 6 carbon atoms;

R^6 denotes hydrogen or a group selected from the group consisting of those of the formulae

$-COR^7$ and $-CO-N(R^7)R^8$;

R^7 denotes an unsubstituted hydrocarbon group, an unsubstituted heterocyclic group, a substituted hydrocarbon group, or a substituted heterocyclic group, wherein the substituents for the said hydrocarbon and heterocyclic groups are one or more substituents selected from the group consisting of

alkyl, amino, alkanoylamino, monoalkylamino, dialkylamino, hydroxy, alkoxy, mercapto, alkylthio, sulphamoyl, carbamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, carboxy, carboxy salts, carboxy esters, alkanoyloxy, alkylcarbonyl, arylthio, arylcarbonyl, arylalkoxy, heterocyclyl, heterocyclylthio, and heterocyclylcarbonyl;

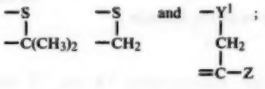
each of said heterocyclyl groups and moieties containing from one to four hetero-atoms selected from the group consisting of oxygen, nitrogen and sulphur, and being unsubstituted or being substituted by from one to three substituents selected from the group consisting of halogen, alkyl, alkoxy, haloalkyl, hydroxy, amino, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, aryl and oxo;

each of said aryl groups and moieties being selected from the group consisting of unsubstituted phenyl, unsubstituted naphthyl, substituted phenyl, and substituted naphthyl, wherein the substituents for said substituted phenyl and naphthyl are from one to five substituents selected from the group consisting of halogen, alkyl, phenyl, alkoxy, haloalkyl, hydroxy, amino, nitro, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, alkylcarbonyloxy and alkylcarbonyl;

each of said alkyl groups and moieties having from 1 to 6 carbon atoms;

R^8 denotes hydrogen or alkyl having from 1 to 6 carbon atoms;

Y denotes a grouping selected from the group consisting of those of the formulae



Y^1 denotes oxygen, sulphur, or $-CH_2-$;

Z denotes hydrogen, halogen, alkoxy having from 1 to 4 carbon atoms, or a group selected from the group consisting of those of the formulae

$-CH_2-Q$ and $-CH=CH-Q$;

Q denotes hydrogen, halogen, hydroxy, mercapto, cyano, carboxy, carbamoyloxy, carboxylic ester, alkoxy having from 1 to 4 carbon atoms, acyloxy, aryl, heterocyclyl bonded thru a carbon atom of the heterocyclyl group, nitrogen-containing heterocyclyl bonded thru a nitrogen atom of the heterocyclyl group, or a group of the formula

$-S-Het$;

said carbon-bonded heterocyclyl group containing from one

to four hetero-atoms selected from the group consisting of oxygen, nitrogen and sulphur, and being unsubstituted or being substituted by from one to three substituents selected from the group consisting of halogen, alkyl, alkoxy, haloalkyl, hydroxy, amino, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, aryl and oxo;

said nitrogen-bonded heterocyclyl group containing from one to four heteroatoms selected from the group consisting of nitrogen, oxygen and sulphur, and being unsubstituted or substituted by one or two substituents selected from alkyl, alkoxy, hydroxyalkyl, alkenyl, alkoxyalkyl, carboxyalkyl, alkylsulphonyl, sulphonylalkyl, carbamoylmethyl, carbamoyl, trifluoromethyl, hydroxy, halogen, oxo, dialkylaminoalkyl, and aminoalkyl;

each of said aryl groups and alkyl moieties being selected from the group consisting of unsubstituted phenyl, unsubstituted naphthyl, substituted phenyl, and substituted naphthyl, wherein the substituents for said substituted phenyl and naphthyl are from one to five substituents selected from the group consisting of halogen, alkyl, phenyl, alkoxy, haloalkyl, hydroxy, amino, nitro, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl, alkylcarbonyloxy and alkylcarbonyl;

each of said alkyl groups and moieties having from 1 to 6 carbon atoms;

Het denotes a heterocyclyl ring having 5 or 6 ring atoms, from 1 to 4 of said ring atoms being selected from the group consisting of nitrogen, oxygen and sulphur, and said ring being unsubstituted or substituted by one or two substituents selected from the group consisting of:

alkyl, alkoxy, hydroxyalkyl, alkenyl, alkoxyalkyl, carboxyalkyl, sulphonylalkyl, carbamoylalkyl, trifluoromethyl, hydroxy, halogen, oxo, aminoalkyl, substituted-aminoalkyl, and alkylsulphonic acid;

or said ring being fused to another heterocyclic or carbocyclic ring, in combination with a pharmaceutically acceptable carrier.

4,684,640

ANTIBACTERIAL PENEM DERIVATIVES

Michael D. Cooke, Newport Pagnell, and Barry C. Ross, Luton, both of Great Britain, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 395,641, Jul. 6, 1982, abandoned. This application Apr. 2, 1985, Ser. No. 718,200

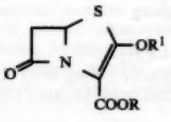
Claims priority, application United Kingdom, Jul. 8, 1981, 8121107

The portion of the term of this patent subsequent to Apr. 29, 2003, has been disclaimed.

Int. Cl.[4] C07D *499/00*; A61K *31/425*

U.S. Cl. 514—195 **14 Claims**

1. A penem derivative of the formula I



I

in which

R is hydrogen or a carboxyl esterifying group

R^1 is phenyl or naphthyl, each which is unsubstituted or substituted by one, two or three substituents, which may be the same or different, selected from the group consisting of halogen, cycloalkyl having from 5 to 10 carbon atoms —NH_2, —$CONH_2$, —NO_2, —CN, —R^2, —OR^2, —SR^2, —SO—R^2, —SO_2R^2, —CO—R^2, —CO—O—R^2, —CH_2—CO—O—R^2, —NHR^2, —$NR^2R^{2'}$, —CO—N—H—R^2, —CO—$NR^2R^{2'}$, —NH—CO—R^2, —N—H—CO—NH_2, —NH—CO—NH—R^2, —N—H—SO_2—R^2, —CF_3, —CO—OH, —CH_2—CO—OH, wherein R^2 and $R^{2'}$ are the same or different and each represents alkyl of 1 to 4 carbon atoms

or a physiologically acceptable salt thereof.

4,684,641

7-HYDROXYAMINOCEPHALOSPORIN ANTIBIOTICS

Colin W. Greengrass; David W. T. Hoople, both of Sandwich, and Thomas T. Howarth, Margate, all of England, assignors to Pfizer Inc., New York, N.Y.

Filed Jun. 27, 1985, Ser. No. 749,915

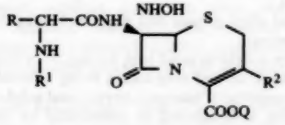
Claims priority, application United Kingdom, Jun. 28, 1984, 8416498; Oct. 11, 1984, 8425751

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.[4] C07D *501/57*; A61K *31/545*

U.S. Cl. 514—201 **20 Claims**

1. A cephalosporin having the formula



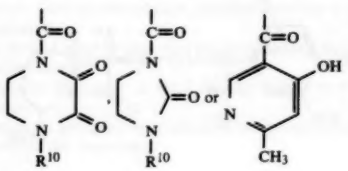
wherein

Q is hydrogen or a radical forming an in vivo hydrolyzable ester;

R is phenyl, hydroxyphenyl, dihydroxyphenyl, benzyloxycarbonyloxyphenyl, 2-thienyl or 3-thienyl; and the amide side chain is in the D- or the DL-stereochemical form; or

R is CH_3—CH(OH)—, CH_3—$CH(OSO_3H)$— or CH_3—CH-(OCH_3)—; and the amide side chain is in the 2R,3S stereochemical form;

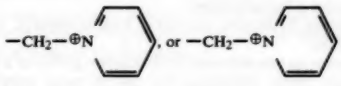
R^1 is —$CONH_2$,



and

R^{10} is hydrogen, C_1–C_8 alkyl, phenyl, benzyl or —SO_2(-C_1–C_4 alkyl);

R^2 is —CH_2OCOCH_3, —CH_2N_3, —CH_2S-Het,



$(CH_2)_n$

n is 3 or 4; and

Het is a heterocyclic group which is a triazolyl, tetrazolyl, thiazolyl, isothiazolyl, oxazolyl, oxadiazolyl, triazinyl, oxodihydrotriazinyl, dioxotetrahydrotriazinyl, thiadiazolyl, benzoxazolyl, benzothiazolyl or tetrazolopyridazinyl group; one of said heterocyclic groups monosubstituted by C_1–C_4 alkoxy, halo or a group of the formula —$(CH_2)_pR^{16}$ where p is 0, 1, 2 or 3 and R^{16} is —COOH, —OSO_2OH, —SO_2OH or —OH, with the proviso that p is other than zero when Het is tetrazolyl; or one of said

monosubstituted heterocyclic groups further substituted by a methyl group; said heterocyclic groups attached to the adjacent S atom by a carbon atom of the heterocyclic ring;

or a pharmaceutically acceptable cationic salt thereof when Q is hydrogen or the group R^1 contains a further acidic functionality.

4,684,642

7-HYDROXYAMINOCEPHALOSPORIN ANTIBIOTICS

Colin W. Greengrass; David W. T. Hoople, both of Sandwich, and Thomas T. Howarth, Margate, all of England, assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 749,915, Jun. 27, 1985. This application Mar. 5, 1986, Ser. No. 836,771

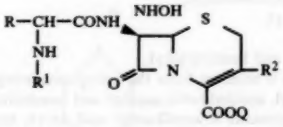
Claims priority, application United Kingdom, Dec. 18, 1985, 8531202

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.[4] C07D *501/57;* A61K *31/545*

U.S. Cl. 514—201 29 Claims

1. A cephalosporin having the formula

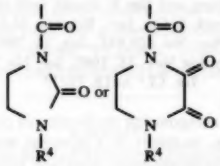


wherein

Q is hydrogen or a radical forming an in vivo hydrolyzable ester;

R is thiazolyl, thiadiazolyl, furyl or pyridyl; and the amide side chain is in the D- or DL-stereochemical form;

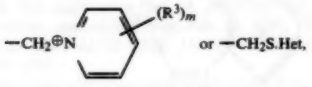
R^1 is a group of the formula



where

R^4 is C_1–C_4 alkyl or $—SO_2(C_1$–C_4alkyl),

R^2 is $—CH_2OCOCH_3$, $—CH_2OCONH_2$ or a group of the formula



where m is 1 or 2; each R^3 is independently H or C_1–C_4 alkyl; and Het is a heterocyclic group which is a triazolyl, tetrazolyl, thiazolyl, isothiazolyl, oxazolyl, oxadiazolyl, triazinyl, oxodihydrotriazinyl, dioxotetrahydrotriazinyl, thiadiazolyl, benzoxazolyl, benzothiazolyl or tetrazolopyridazinyl group; one of said heterocyclic groups substituted by 1 or more groups selected from C_1–C_4 alkyl, C_1–C_4 alkoxy, halo, oxo or a group of the formula $—(CH_2)_pR^5$ where p is 0, 1, 2 or 3 and R^5 is —COOH, $—OSO_2OH$, $—SO_2OH$, $—PO_3H_2$ or —OH, with the proviso that p is not zero when Het is tetrazolyl; or a pharmaceutically-acceptable cationic salt thereof when Q is hydrogen or the group R^2 contains a further acidic functionality.

4,684,643

PHARMACEUTICAL COMPOSITIONS FOR STORAGE IN PLASTIC CONTAINERS AND PROCESS THEREFOR

Harry C. Buddenbaum, Indianapolis, and Robert L. Robison, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 525,347, Aug. 22, 1983, Pat. No. 4,533,542. This application Jun. 3, 1985, Ser. No. 740,788

Int. Cl.[4] A61J *3/02*

U.S. Cl. 514—204 10 Claims

1. A pharmaceutical composition in a plastic container in which haze tends to form upon re-constitution, said composition consisting essentially of the injectable form of cephalothin, ampicillin, cefamandole, moxalactam, vancomycin, tobramycin or ceftazidime in powder form with a surfactant.

4,684,644

BASIC MONOCARBOXYAMIDE DERIVATIVES OF ACTAGARDINE HAVING ANTIBIOTIC ACTIVITY AND COMPOSITIONS THEREOF

Adriano Malabarba, and Bruno Cavalleri, both of Milan, Italy, assignors to Gruppo Lepetit S.p.A., Gerenzano, Italy

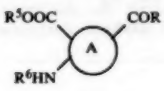
Filed Mar. 21, 1986, Ser. No. 842,523

Claims priority, application United Kingdom, Mar. 22, 1985, 8507528

Int. Cl.[4] A61K *35/74, 35/00;* C07D *295/14*

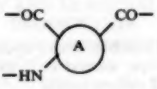
U.S. Cl. 514—210 7 Claims

1. Basic monoamide derivatives of actagardine of formula



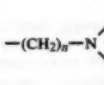
I

wherein the group



represents the actagardine nucleus, R represents the group

wherein R^1 and R^2 independently represents hydrogen, a group of formula



in which n represents an integer from 2 to 8 and R^3 and R^4 independently represent hydrogen or $(C_1$–$C_4)$alkyl or R^3 and R^4 taken together represent a $—(CH_2)_3—$, $—(CH_2)_4—$, $—(CH_2)_2—O—(CH_2)_2—$, $—(CH_2)_2—S—(CH_2)_2—$, or $—(CH_2)_5—$ group, or R^1 and R^2 taken together with the adjacent nitrogen atom represent a piperazine mojety which may be substituted in position 4 with a substituent selected from $(C_1$–$C_4)$alkyl, $(C_5$–$C_7)$cycloalkyl, benzyl, and substituted benzyl wherein the phenyl mojety bears 1 or 2 substituents selected from chloro, bromo, nitro, $(C_1$–$C_4)$alkyl and $(C_1$–$C_4)$al-

koxy, R^5 represents hydrogen, (C_1-C_4)alkyl, (C_1-C_4)alkoxy (C_2-C_4)alkyl, and R^6 represents hydrogen or (C_1-C_4)alkyl, with the proviso that R^1 and R^2 can not simultaneously represent hydrogen, and the acid and base addition salts thereof.

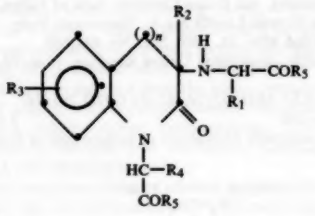
7. A pharmaceutical composition which comprises a compound of claims 1, 2, 3 or 4 in admixture with a pharmaceutically acceptable carrier.

4,684,645
BENZOFUSED LACTAMS AS CHOLECYSTOKININ ANTAGONISTS

Raymond S. L. Chang, Edison, and William H. Parsons, Rahway, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 624,848, Jun. 26, 1984, abandoned. This application Nov. 18, 1985, Ser. No. 799,049
Int. Cl.[4] A61K *31/55, 31/47, 31/395*
U.S. Cl. 514—213 **3 Claims**

1. A method of treating gastrointestinal disorders, central nervous system disorders, or regulating appetite in mammals which comprises administering to a patient in need of such treatment a pharmaceutically effective amount of a compound having the formula:



I

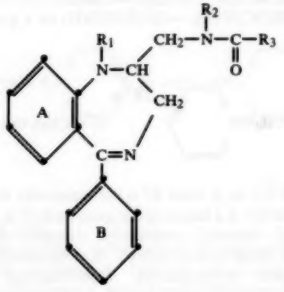
wherein
n is 1, 2 or 3,
R_4 is hydrogen, ower alkyl, aryl;
R_2 is hydrogen,
R_3 is H, halo, lower alkyl, lowercycloalkyl, or loweralkoxy,
R_1 is
hydrogen;
alkyl of from 1 to 12 carbon atoms; cycloalkyl of from 5 to 8 methylene groups; alkenyl or 2 to 12 carbon atoms; alkynyl or 2 to 12 carbon atoms;
substituted loweralkyl wherein the substituent can be halo, hydroxy, carboxy, carboxamido, loweralkylthio, loweralkoxy, loweralkoxycarbonyl, loweraralkoxycarbonyl, amino, loweralkylamino, lowerdialkylamino, acylamino;
substituted loweralkylamino wherein the substituent can be halo, hydroxy, alkoxy or cyano; arloweralkylamino; aryloxy; arylthio; aralkyloxy; aralkylthio; benzofused cycloalkyl or bicycloalkyl of from 8–12 carbon atoms;
aryl or heteroaryl which may be mono-, di- or tri-substituted by loweralkyl, hydroxy, loweralkoxy, halo, amino, acylamino, loweralkylthio or aminoloweralkyl;
benzofused cycloalkyl or bicycloalkyl of from 8 to 12 carbon atoms;
arloweralkyl, arloweralkenyl, heteroaryllowerakyl and heteroaryllowerakenyl in which the aryl or heteroaryl rings may be mono-, di- or tri-substituted by halo, loweralkyl, hydroxy, loweralkoxy, amino, loweralkylamino, diloweralkylamino, aminoloweralkyl, acylamino, carboxy, halololoweralkyl, nitor, cyano or sulfonamido; aralkyl or heteroaralkyl which include branched loweralkyl groups;
substituted aralkyl or substituted heteroaralkyl which include branched loweralkyl groups wherein the loweralkyl groups can be substituted by amino, acylamino, or hydroxyl and the aryl and heteroaryl groups can be substituted by halo, dihalo, loweralkyl, hydroxy, loweralkoxy, aryloxy, aroyl, arylthio, amino, aminoloweralkyl, loweralkanoylamino, aroylamino, lowerdialkylamino, loweralkylamino, hydroxy, hydroxyloweralkyl, trihalolooweralkyl, nitro, cyano, or sulfonamido;
any of the arloweralkyl or alkenyl and heteroloweralkyl or alkenyl groups described above in which the aryl or heteroaryl ring is partially or completely hydrogenated;
substituted loweralkyl having the formula $R_A{}^1(CH_2)_n—Q—(CH_2)_m$ wherein n is 0–2, n is 1–3, $R_A{}^1$ is aryl or heteroaryl optionally substituted by amino, lower-dialkylamino, loweralkylamino, hydroxy, hydroxyloweralkyl, aminoloweralkyl, trihalololoweralkyl, cyano, nitro, sulfonamido, aroyl, loweralkyl, halo, dihalo, and loweralkoxy, and Q is O, S, SO, SO_2, $N—R_B{}^1$, $CONR_C{}^1$, $NR_C{}^1CO$, CH=CH wherein $R_B{}^1$ is hydrogen, loweralkyl, aryl, aralkyl, loweralkanoyl, or aroyl, and $R_C{}^1$ is hydrogen, or loweralkyl;
R_5 is
$—OR_6$ or $—NR_7R_8$ wherein R_6, R_7 and R_8 are independently selected from hydrogen;
lower alkyl;
substituted lower alkyl wherein the substituents are monohydrozy, dihydroxy or acylamino;
acylloweralkyl;
carboxyloweralkyl;
carboxamidoloweralkyl;
arloweralkyl;
aryl;
heteroaryl and heteroaralkyl;
wherein aryl is selected from the group consisting of unsubstitued phenyl, unsubstituted napthyl and unsubstituted biphenyl; acyl represents loweralkanoyl and aroyl; heteroaryl is selected from the group consisting of pyridyl, thienyl, furyl, imidazolyl, thiazolyl, indolyl, quinolinyl, isoquinolinyl, benzimidazolyl, benzothiazoly, benzthienyl and naphthyridyl; and, the pharmaceutically acceptable salts thereof.

4,684,646
2-ACYLAMINOMETHYL-1,4-BENZODIAZEPINE DERIVATIVES AS CCK-ANTAGONISTS

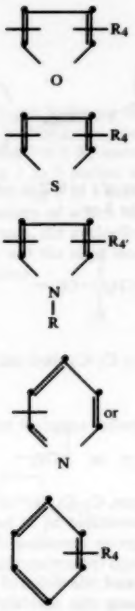
Raymond S. L. Chang, and Ben E. Evans, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 624,841, Jun. 26, 1984, abandoned. This application Nov. 18, 1985, Ser. No. 799,050
Int. Cl.[4] A61K *31/55*
U.S. Cl. 514—221 **2 Claims**

1. A method of antagonizing the binding of cholecystokinins to cholecystokinin receptors in a mammal which comprises contacting said cholecystokinin receptors with a compound represented by the formula:



wherein:
R_1 represents hydrogen, straight or branched chain C_{1-4}-alkyl or C_{1-4}-alkenyl, or cyclopropylmethyl;
R_2 represents hydrogen, or straight or branched chain C_{1-4}-alkyl or C_{1-4}-alkenyl;
R_3 represents a group of the formula a, b, c, d or e:



wherein:

R is hydrogen or C_{1-3}-alkyl;

R_4 is hydrogen, straight or branched chain C_{1-4}-alkyl, or C_{1-4}-alkoxy, nitro or chlorine, fluorine, or bromine;

R_4' is hydrogen or C_{1-4}-alkyl;

and the aromatic groups, A and B, independently, may be unsubstituted or mono-, di- or tri-substituted where the substituents are selected from the group consisting of Cl, Br, F, C_{1-4}-alkylthio, C_{1-4}-alkoxy, C_{1-4}-alkyl, hydroxy, nitro, and trifluoromethyl, and pharmaceutically-acceptable salts thereof.

4,684,647

ANTI-BACTERIAL PYRIDO-BENZOTHIAZINE DERIVATIVE AND PHARMACEUTICAL COMPOSITION THEREFOR

Giuseppe Mascellani, Monte S. Pietro; Arnaldo Fravolini, S. Sisto, and Patrizia Terni, Milan, all of Italy, assignors to Mediolanum Farmaceutici S.R.L., Milan, Italy

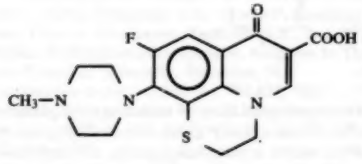
Division of Ser. No. 765,154, Aug. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 703,894, Feb. 21, 1985, abandoned. This application Oct. 24, 1986, Ser. No. 922,712

Claims priority, application Italy, Feb. 24, 1984, 19790 A/84

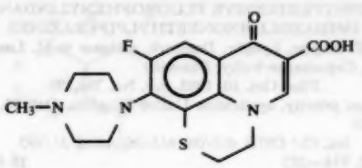
Int. Cl.[4] **A01N** *43/60;* **A61K** *31/495;* **C07D** *513/16*

U.S. Cl. 514—222 **2 Claims**

1. A pyrido-benzothiazone compound of the formula



2. An antibacterial composition comprising an antibacterially effective amount of the compound of formula



and a pharmaceutically acceptable diluent or carrier.

4,684,648

ANTIMICROBIAL 1-SUBSTITUTED PHENYL-4-OXOQUINOLINE-3-CARBOXYLIC ACID COMPOUNDS AND COMPOSITIONS THEREOF

Hitoshi Tone; Hisashi Miyamoto; Hiraki Ueda, and Kazuyuki Nakagawa, all of Tokushima, Japan, assignors to Otsuka Pharmaceutical Company Limited, Tokyo, Japan

Filed Aug. 28, 1985, Ser. No. 770,080

Claims priority, application Japan, May 10, 1985, 60-100056; Jul. 22, 1985, 60-162569

Int. Cl.[4] **A61K** *31/40, 31/47;* **C07D** *401/14*

U.S. Cl. 514—249 **2 Claims**

1. 6-Fluoro-1-(4-acetyloxyphenyl)-7-(1,4-diazabicyclo[4.3.0] nonan-1-yl)-1,4-dihydro-4-oxoquinoline-3-carboxylic acid or a pharmaceutically acceptable salt thereof.

2. An antimicrobial composition which comprises as an essential active ingredient an antimicrobially effective amount of 6-fluoro-1-(4-acetyloxyphenyl)-7-(1,4-diazabicyclo[4.3.0]-nonan-1-yl)-1,4-dihydro-4-oxoquinoline-3-carboxylic acid or a pharmaceutically acceptable salt thereof in a conventional pharmaceutically acceptable diluent or carrier.

4,684,649

QUINOXALINE DERIVATIVES USEFUL FOR TREATMENT AND PROPHYLAXIS OF SWINE DYSENTERY AND AS ANIMAL GROWTH PROMOTANTS

Enrico Marotta, and Lucia Castronuovo, both of Via Andrea Verga 8, 20144 Milan, Italy

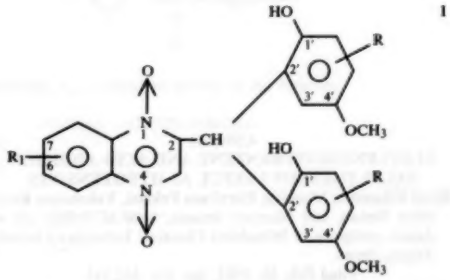
Filed Feb. 3, 1986, Ser. No. 825,643

Claims priority, application United Kingdom, Mar. 1, 1985, 8505286

Int. Cl.[4] **C07D** *241/52;* **A61K** *31/495*

U.S. Cl. 514—249 **8 Claims**

1. A compound of the structure I:



wherein the two substituents R on the phenyl rings are equal or different and represents C_1–C_5 lower alkyl, and R_1 is a 6- or 7-position substituent selected from the group consisting of hydrogen, halogen, C_1–C_4 lower alkyl, C_1–C_4 lower alkoxy and C_1–C_4 lower alkanoyl.

4,684,650

ANTIHYPERTENSIVE FLUOROPHENYLINDANYL IMIDAZOLIDINONEETHYLPIPERAZINES

Klaus P. Bogeso, Lyngby, Denmark, assignor to H. Lundbeck A/S, Copenhagen-Valby, Denmark

Filed Oct. 10, 1985, Ser. No. 786,199

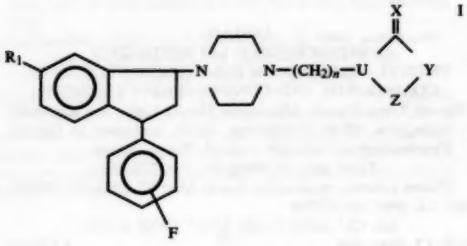
Claims priority, application United Kingdom, Oct. 26, 1984, 8427125

Int. Cl.[4] C07D *403/06, 413/06;* **A61K** *31/495*

U.S. Cl. 514—252 **10 Claims**

1. A compound selected from the group consisting of

(a) a 1-piperazine-3-phenylindane of the formula:



I

wherein R_1 is selected from H, halogen, an alkyl group having from one to three carbon atoms inclusive, a methoxy group, a methylthio group and a trifluoromethyl group,

n is 2–4

X is selected from O and S,

Y is selected from O, CH_2 and N—R_2, where R_2 is selected from hydrogen, and (1–6 C)alkyl, (2–6 C)alkenyl and a cycloalkyl-methyl group having from three to six carbon atoms,

Z is selected from —$(CH_2)_n$, wherein n is 2, and 1,2-phenylene optionally substituted with a group selected from halogen and trifluoromethyl,

U is selected from N and C, with the proviso that when X is O, Y is selected from O and NH, U is N, Z is —$(CH_2)_2$, R_1 may not be a group selected from halogen, an alkyl group having from one to three carbon atoms inclusive, a methoxy group, a methylthio-group and a trifluoromethyl group, and

(b) a pharmaceutically acceptable acid addition salt thereof.

4,684,651

ALKYLENEDIOXYBENZENE AND ACID ADDITION SALTS THEREOF USEFUL AS HYPOTENSIVES

Ryoji Kikumoto, Machida; Harukazu Fukami, Yokohama; Kenichiro Nakao, and Mamoru Sugano, both of Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

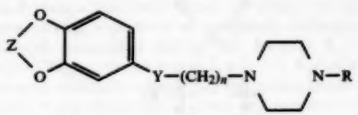
Filed Feb. 26, 1982, Ser. No. 352,716

Claims priority, application Japan, Mar. 17, 1981, 56-38233; Mar. 17, 1981, 56-38234

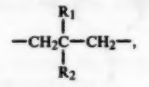
Int. Cl.[4] A61K *31/495;* **C07D** *405/06, 405/12, 405/14*

U.S. Cl. 514—253 **3 Claims**

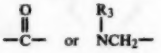
1. A method of treating a hypertensive subject, comprising: administering to said hypertensive subject a therapeutically effective amount of an alkylenedioxybenzene compound of the formula:



wherein n is an integer of 1 to 6; Z is —$(CH_2)_m$—, wherein m is an integer of 1 to 3 or



wherein R_1 is hydrogen or C_1–C_3 alkyl and R_2 is C_1–C_3 alkyl; Y is —CH(OH)—,



wherein R_3 is hydrogen, C_1–C_3 alkyl or C_1–C_3 acyl; and R is phenyl, phenyl substituted by at least one substituent selected from the group consisting of halogen, C_1–C_5 alkyl, C_1–C_5 alkoxy and trifluoromethyl, or pyridyl, or an acid addition salt thereof, the extent of substitution of said phenyl ring being such that said alkylenedioxybenzene compound must possess significant hypotensive activity.

4,684,652

PHARMACEUTICAL COMPOSITIONS CONTAINING NAPHTHALENE-AND AZANAPHTHALENE-CARBOXAMIDE DERIVATIVES, NEW NAPHTHALENE-AND AZANAPHTHALENE-CARBOXAMIDE DERIVATIVES AND PROCESS FOR THEIR PREPARATION

Marie-Christine Dubroeucq, Enghien-Les-Bains; Gerard R. Le Fur, Le Plessis-Robinson, and Christian L. A. Renault, Taverny, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

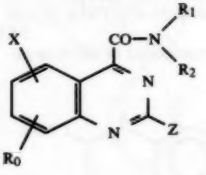
Division of Ser. No. 564,322, Dec. 22, 1983. This application Aug. 8, 1985, Ser. No. 763,660

Claims priority, application France, Dec. 24, 1982, 82 21758

Int. Cl.[4] A61K *31/505;* **C07D** *403/02*

U.S. Cl. 514—254 **12 Claims**

1. A pharmaceutical composition useful in the treatment of anxiety states or of pulmonary, renal, circulatory or cardiovascular disorders, which comprises as active ingredient, an effective amount of a compound of the formula:

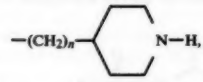


(I)

in which R_1 represents a linear or branched alkyl group having 1 to 6 carbon atoms, a phenyl group, a cycloalkyl group having 3 to 6 carbon atoms, a phenylalkyl group, the alkyl moiety of which has 1 to 3 carbon atoms, a cycloalkyl-alkyl group, the cycloalkyl moiety of which has 3 to 6 carbon atoms and the alkyl moiety of which has 1 to 3 carbon atoms, or a group

in which R_3 and R_4 are hydrogen atoms or alkyl groups and R_5 is an alkenyl or alkynyl group, the sum of the carbon atoms in R_3, R_4 and R_5 being 2 to 5, R_2 represents a linear or branched alkyl group having 1 to 6 carbon atoms, a phenyl group, a cycloalkyl group having 3 to 6 carbon atoms, a phenylalkyl group, the alkyl moiety of which has 1 to 3 carbon atoms, a cycloalkyl-alkyl group, the cycloalkyl moiety of which has 3 to 6 carbon atoms and the alkyl moiety of which has 1 to 3 carbon atoms, a group

in which R_3, R_4 and R_5 are as defined above, or a group



in which n is 0, 1, 2 or 3, it also being possible for R_1 and R_2 together to form, with the nitrogen atom to which they are attached, a 5-, 6-, or 7-membered heterocyclic radical which may contain another heteroatom chosen from amongst nitrogen and oxygen and which may carry one or two substituents chosen from amongst alkyl groups having 1 to 3 carbon atoms, the hydroxyl group, the oxo group and hydroxyalkyl, dimethylaminoalkyl and diethylaminoalkyl groups, the alkyl moieties of which have 1 to 3 carbon atoms, Z represents a phenyl, pyridinyl, thienyl or thiazol-2-yl group or a phenyl group substituted by one or two substituents selected from amongst halogen atoms, alkyl, alkoxy and alkylthio groups having 1 to 3 carbon atoms, the trifluoromethyl group, and the nitro group, X and R_0 are identical or different and represent hydrogen atoms or halogen atoms, alkyl or alkoxy groups having 1 to 3 carbon atoms or nitro or trifluoromethyl groups, or a stereoisomer or mixture of stereoisomers thereof, or a pharmaceutically acceptable acid addition salt thereof, in association with a pharmaceutically acceptable carrier or coating.

4,684,653

PYRIDO(2,3-d)PYRIMIDINE DERIVATIVES

Edward C. Taylor, Princeton, N.J.; George P. Beardsley, Essex, Conn.; Peter J. Harrington, Endicott, N.Y., and Stephen R. Fletcher, Buckinghamshire, England, assignors to The Trustees of Princeton University, Princeton, N.J.

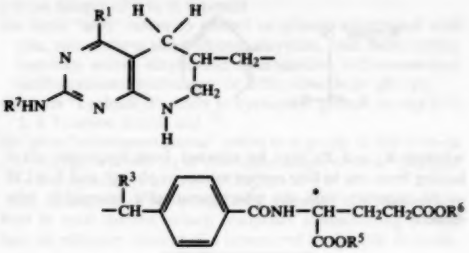
Continuation-in-part of Ser. No. 709,622, Mar. 8, 1985, abandoned. This application Mar. 3, 1986, Ser. No. 835,457

Int. Cl.[4] **A61K** *31/505;* **C07D** *471/04, 475/04, 475/08*

U.S. Cl. 514—258 **16 Claims**

13. A compound selected from the group consisting of:

(i) 5,6,7,8-tetrahydropyrido[2,3-d]pyrimidines of the formula:



wherein

R^1 is amino or hydroxy;

R^3 is hydrogen, methyl, or ethyl;

R^5 and R^6 are the same or different carboxylic acid protecting group;

R^7 is hydrogen or an amino protecting group; and

the configuration about the carbon atom designated * is L; and

(ii) the tautomeric forms thereof.

4,684,654

3-HETEROALKYL-2,4-QUINZAOLINEDIONES

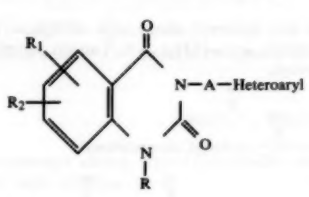
William B. Wright, Jr., Woodcliff Lake, and Andrew S. Tomcufcik, Old Tappan, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Aug. 14, 1985, Ser. No. 765,417

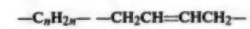
Int. Cl.[4] **A61K** *31/505;* **C07D** *403/06*

U.S. Cl. 514—259 **20 Claims**

14. A method of inhibiting thromboxane synthetase enzyme in a mammal in need thereof which comprises administering internally to said mammal a pharmacologically effective amount of a compound selected from those of the formula:

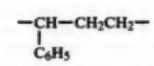


wherein A is a divalent moiety of the formula:

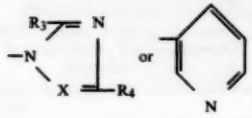


or

or



wherein n is an integer from 2–10, inclusive; R is hydrogen or alkyl having from one to four carbon atoms; R_1 and R_2 may be the same or different and may be selected from the group consisting of hydrogen, halogen, trifluoromethyl, alkoxy having from one to four carbon atoms, alkyl having from one to four carbon atoms, nitro and amino; wherein Heteroaryl is



wherein R_3 and R_4 may be selected from hydrogen, alkyl having from one to four carbon atoms, or phenyl; and X is CH or N, together with the pharmaceutically acceptable salts thereof.

4,684,655

1,2,3,4-TETRAHYDRO-6-SUBSTITUTED-4-ARYL-3-SUBSTITUTED-2-THIOXO(OR OXO)-5-PYRIMIDINECARBOXYLIC ACIDS AND ESTERS AND USE THEREOF TO LOWER BLOOD PRESSURE

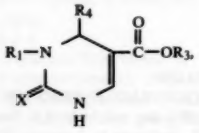
Karnail Atwal, Cranbury, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 14, 1986, Ser. No. 839,770

Int. Cl.[4] A61K *31/505*; C07D *239/22*

U.S. Cl. 514—274 **21 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof wherein

X is oxygen or sulfur;

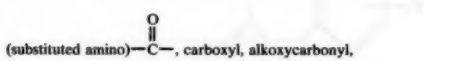
R_1 is cycloalkyl, alkenyl, alkynyl, aryl, $-(CH_2)_n-Y_2$, $-(CH_2)_p-Y_3$ or halo substituted alkyl;

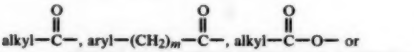
R_2 is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, $-(CH_2)_n-Y_1$, or halo substituted alkyl;

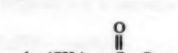
R_3 is hydrogen, alkyl, cycloakyl, aryl, $-(CH_2)_n-Y_2$, $-(CH_2)_p-Y_3$, or halo substituted alkyl;

R_4 is aryl;

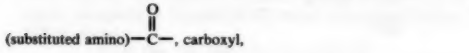
Y_1 is cycloalkyl, aryl, hydroxyl, alkoxy, aryl—$(CH_2)_m$—, O—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—, amino, substituted amino, carbamoyl,

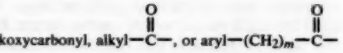




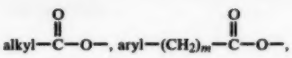


Y_2 is cycloalkyl, aryl, carbamoyl,





Y_3 is hydroxyl, alkoxy, aryl—$(CH_2)_m$—O—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—,



amino, or substituted amino;

m is 0 or an integer of 1 to 6;

n is an integer of 1 to 6; and

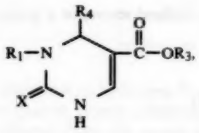
p is an integer of 2 to 6; wherein

the term "aryl" refers to phenyl or phenyl substituted with one, two or three alkyl, alkoxy, alkylthio, halo, nitro, cyano, hydroxy, amino, alkylamino, dialkylamino, trifluoromethyl, isothiocyanato, isocyanato, or difluoromethoxy groups;

the term "substituted amino" refers to a group of the formula $-NZ_1Z_2$ wherein Z_1 is hydrogen, alkyl, or aryl—$(CH_2)_m$—and and Z_2 is alkyl or aryl—$(CH_2)_m$—;

the term "cycloalkyl" refers to a group having 3,4,5,6 or 7 carbon atoms.

21. A method of lowering blood pressure in a mammalian host in need thereof, which comprises administering to said host an effective amount of a compound having the formula



or a pharmaceutically acceptable salt thereof wherein

X is oxygen or sulfur;

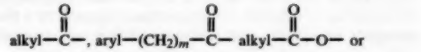
R_1 is cycloalkyl, alkenyl, alkynyl, aryl, $-(CH_2)_n-Y_2$, $-(CH_2)_p-Y_3$ or halo substituted alkyl;

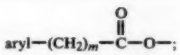
R_2 is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, $-(CH_2)n-Y_1$, or halo substituted alkyl;

R_3 is hydrogen, alkyl, cycloalkyl, aryl, $(CH_2)n-Y_2$, $-(CH_2)p-Y_3$, or halo substituted alkyl;

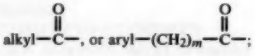
R_4 is aryl;

Y_1 is cycloalkyl, aryl, hydroxyl, alkoxy, aryl—$(CH_2)m$—0—, mercapto, alkylthio, aryl $-(CH_2)m-S-$, amino, substituted amino, carbamoyl,

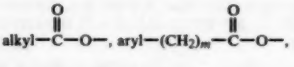




Y_2 is cycloalkyl, aryl, carbamoyl,



Y_3 is hydroxyl, alkoxy, aryl—$(CH_2)_m$—0—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—,



amino, or substituted amino;

m is 0 or an integer of 1 to 6;

n is an integer of 1 to 6; and
p is an integer of 2 to 6;
wherein the term "aryl" refers to phenyl or phenyl substituted with one, two or three alkyl, alkoxy, alkylthio, halo, nitro, cyano, hydroxy, amino, alkyl amino, dialkylamino, trifluoromethyl, isothiocyanato, isocyanato, or difluoromethyoxy groups;
the term "substituted amino" refers to a group of the formula $-NZ_1Z_2$ wherein Z_1 is hydrogen, alkyl, or aryl—$(CH_2)_m$—amd Z_2 is alkyl or aryl—$(CH_2)_m$—; and the term "cycloalkyl" refers to a group having 3, 4, 5, 6 or 7 carbon atoms.

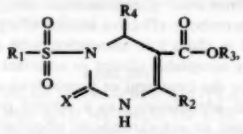
4,684,656

1,2,3,4-TETRAHYDRO-6-SUBSTITUTED-4-ARYL-3-(SUBSTITUTED SULFONYL)-2-THIOXO(OR OXO)-5-PYRIMIDINECARBOXYLIC ACIDS AND ESTERS AND METHOD OF USING THEM TO LOWER BLOOD PRESSURE

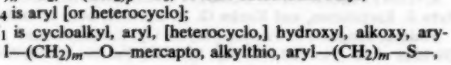
Karnail Atwal, Cranbury, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

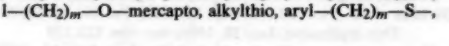
Filed Mar. 14, 1986, Ser. No. 840,130
Int. Cl.[4] A61K *31/505;* **C07D** *239/22*
U.S. Cl. 514—274 **21 Claims**

1. A compound having the formula

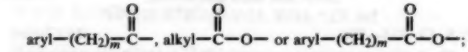


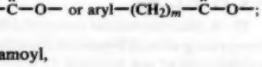
or a pharmaceutically acceptable salt thereof wherein
X is oxygen or sulfur;
R_1 is alkyl, cycloalkyl, aryl, [heterocyclo,]—$(CH_2)_n$—Y_1, or halo substituted alkyl;
R_2 is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, —$(CH_2)_n$—Y_1, or halo substituted alkyl;
R_3 is hydrogen, alkyl, cycloalkyl, aryl, [heterocyclo,]—$(CH_2)_n$—Y_2, —$(CH_2)_p$—Y_3, or halo substituted alkyl;
R_4 is aryl [or heterocyclo];
Y_1 is cycloalkyl, aryl, [heterocyclo,] hydroxyl, alkoxy, aryl—$(CH_2)_m$—O—mercapto, alkylthio, aryl—$(CH_2)_m$—S—,



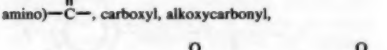


Y_2 is cycloalkyl, aryl, carbamoyl,



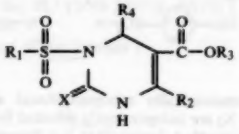


Y_3 is hydroxyl, alkoxy, aryl—$(CH_2)_m$—O—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—,

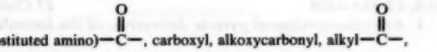


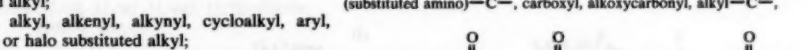
amino, or substituted amino;
m is O or an integer of 1 to 6;
n is an integer of 1 to 6; and
p is an integer of 2 to 6; wherein
the term "aryl" refers to phenyl or phenyl substituted with one, two or three alkyl, alkoxy, alkylthio, halo, nitro, cyano, hydroxy, amino, alkylamino, dialkylamino, trifluoromethyl, isothiocyanato, isocyanato, or difluoromethoxy groups;
the term "cycloalkyl" refers to cycloalkyl groups having 3, 4, 5, 6 7 carbon atoms; and
the term "substituted amino" refers to a group of the formula $-NZ_1Z_2$ wherein Z_1 is hydrogen, alkyl, or aryl—$(CH_2)_m$—and Z_2 is alkyl or aryl—$(CH_2)_m$—.

21. A method of lowering blood pressure in a mammalian host in need thereof, which comprises administering to said host an effective amount of a compound having the formula

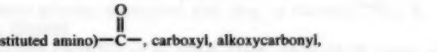


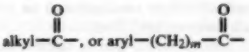
or a pharmaceutically acceptable salt thereof wherein
X is oxygen or sulfur;
R_1 is alkyl, cycloalkyl, aryl, —$(CH_2)_n$—Y_1, or halo substituted alkyl;
R_2 is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, —$(CH_2)_n$—Y_1, or halo substituted alkyl;
R_3 is hydrogen, alkyl, cycloalkyl, aryl, [heterocyclo,]—$(CH_2)_n$—Y_2,—$(CH_2)_p$—Y_3, or halo substituted alkyl;
R_4 is aryl;
Y_1 is cycloalkyl, aryl, hydroxyl, alkoxy, aryl—$(CH_2)_m$—O—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—, amino, substituted amino, carbamoyl,



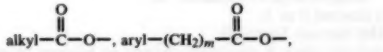


Y_2 is cycloalkyl, aryl, carbamoyl





Y_3 is hydroxyl, alkoxy, aryl—$(CH_2)_m$—O—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—,



amino, or substituted amino;
m is 0 or an integer of 1 to 6;
n is an integer of 1 to 6; and
p is an integer of 2 to 6; wherein
the term "aryl" refers to phenyl or phenyl substituted with one, two or three alkyl, alkoxy, alkylthio, halo, nitro, cyano, hydroxy, amino, alkylamino, dialkylamino, trifluoromethyl, isothiocyanato, isocyanato, or difluoromethoxy groups;
the term "cycloalkyl" refers to cycloalkyl groups having 3, 4, 5, 6 or 7 carbon atoms; and
the term "substituted amino" refers to a group of the formula $-NZ_1Z_2$ wherein Z_1 is hydrogen, alkyl, or aryl—$(CH_2)_m$— and Z_2 is alkyl or aryl—$(CH_2)_m$—.

4,684,657

BENZENESULPHONAMIDE DERIVATIVES

John T. A. Boyle, Cookham, England, assignor to John Wyeth & Brother Limited

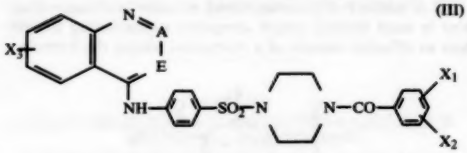
Filed Sep. 30, 1985, Ser. No. 782,258

Claims priority, application United Kingdom, Oct. 3, 1984, 8424979

Int. Cl.[4] A61K *31/495;* **C07D** *401/12*

U.S. Cl. 514—313 **8 Claims**

1. A compound selected from those having the formula



(III)

and their pharmaceutically acceptable acid addition salts, wherein X_1 and X_2 are independently selected from hydrogen, halogen, trifluoromethyl, lower alkyl and lower alkoxy; X_3 is selected from halogen and trifluoromethyl; one of A and E is CH and the other one of A and E is selected from Ch and N.

4,684,658

ANTI-THROMBOTIC ORTHO-CONDENSED PYRROLE DERIVATIVES, COMPOSITIONS, AND METHOD OF USE THEREFOR

Jean-Louis Fabre, Paris; Daniel Farge, Thiais; Claude James, and Daniel Lavé, both of Paris, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

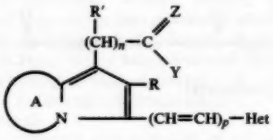
Filed Dec. 20, 1984, Ser. No. 684,061

Claims priority, application France, Dec. 21, 1983, 83 20474

Int. Cl.[4] A61K *31/38;* **C07D** *513/04, 417/14*

U.S. Cl. 514—338 **17 Claims**

1. An ortho-condensed pyrrole derivative, of the formula:



(I)

in which R′ denotes a hydrogen atom or an alkyl or phenyl radical which unsubstituted or substituted by halogen, alkyl, alkyloxy or alkylthio;

Z denotes an oxygen or sulphur atom; p denotes zero or 1; and

(A) either the symbol A denotes a heterocyclic ring which, with the pyrrole nucleus with which it is condensed, forms a ring system selected from 1H,3H-pyrrole[1,2-c]thiazole, 1,2-dihydro-4H-pyrrolo[1,2-c]-1,3-thiazine, and 2,3dihydropyrrolo[2,1-b]thiazole;

n denotes 0 or 1;

Het denotes 3-pyridyl;

and (1) either R denotes hydrogen or halogen or an alkyl or phenyl radical which is unsubstituted or substituted by halogen, alkyl, alkyloxy or alkylthio,

and Y denotes an alkyl or phenyl radical which is unsubstituted or substituted by halogen, alkyl, alkyloxy or alkylthio, or Y denotes a radical of formula:

(II)

in which either R_1 denotes a hydrogen atom and R_2 denotes an unsubstituted alkyl radical, a cycloalkyl radical of 3 to 6 carbon atoms, an alkenyl radical of 2 to 4 carbon atoms, an alkynyl radical of 3 or 4 carbon atoms, or a benzyl or phenyl radical which is unsubstituted or substituted by halogen, alkyl, alkyloxy, alkylthio, trifluoromethyl or nitro, or R_2 denotes an adamantyl, radical, or R_1 and R_2 both denote an unsubstituted alkyl radical;

(2) or R denotes halogen or an alkyl or phenyl radical which is unsubstitued or substituted by halogen, alkyl, alkyloxy or alkylthio, and Y denotes an amino radical;

(B) or the symbol A denotes a heterocyclic ring which, with the pyrrole nucleus with which it is condensed, forms a 2,3-dihydropyrrolo[2,1-b]thiazole ring;

R denotes a hydrogen atom;

Y denotes an amino radical, n denotes zero or 1;

and Het denotes 3-pyridyl;

(C) or the symbol A denotes a heterocyclic ring which, with the pyrrole nucleus with which it is condensed, forms a ring system selected from 1H,3H-pyrrole[1,2-c]thiazole, and 1,2-dihydro-4H-pyrrolo[1,2-c]-1,3-thiazine;

R denotes a hydrogen atom,

Y denotes an amino radical;

and Het denotes 3-pyridyl and n is 1;

it being understood that, unless specifically mentioned, the aforesaid alkyl radicals and alkyl portions contain 1 to 4 carbon atoms each and are straight-chain or branched-chain; and its acid addition salts.

16. An anti-thrombotic pharmaceutical composition comprising an anti-thrombotic effective amount of a pyrrole derivative as claimed in claim **1** in association with a compatible, pharmaceutically acceptable diluent or adjuvant.

17. Method for the treatment or prophylaxis of thrombosis which comprises administering to a subject in which such therapy is required an anti-thrombotic effective amount of a pyrrole derivative as claimed in claim **1**.

4,684,659

ANTIMYPERTENSIVE SUBSTITUTED IMIDAZOLES

Arto J. Karjalainen, and Kauko O. A. Kurkela, both of Oulu, Finland, assignors to Farmos-Yhtyma Oy, Turku, Finland

Division of Ser. No. 233,306, Feb. 11, 1981, Pat. No. 4,568,686. This application Jan. 28, 1986, Ser. No. 823,239

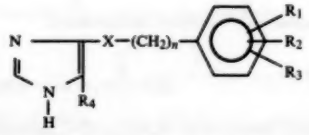
Claims priority, application United Kingdom, Feb. 13, 1980, 8004748

The portion of the term of this patent subsequent to Apr. 17, 2001, has been disclaimed.

Int. Cl.[4] A61K *31/415;* **C07D** *233/64*

U.S. Cl. 514—396 **16 Claims**

10. A pharmaceutical composition for treating hypertension comprising an anti-hypertensive effective amount of 4-arylalkylimidazole of the formula:



wherein each of R_1, R_2 and R_3, which can be the same or different, is hydrogen, chloro, methyl, or ethyl, at least one of R_1, R_2 and R_3 being other than hydrogen, R_4 is hydrogen or methyl; X is —CH_2— or —CHOH—; and n is 1 or 2; or a non-toxic pharmaceutically acceptable acid addition salt thereof, in association with a compatible pharmaceutically acceptable carrier.

4,684,660

MERCAPTOACYLDEPEPTIDES

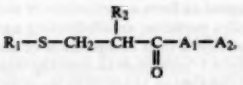
Miquel A. Ondetti, Princeton, and Josip Pluscec, Ewing Twp., Mercer County, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation of Ser. No. 25,701, Apr. 2, 1979, abandoned. This application May 1, 1980, Ser. No. 145,516

Int. Cl.[4] A61K *31/40, 31/405, 31/425, 37/43;* **C07D** *207/00, 275/02*

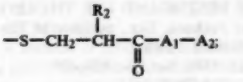
U.S. Cl. 514—423 **22 Claims**

1. A compound having the formula



or an alkyl ester or a salt thereof, wherein

R_1 is hydrogen, or



R_2 is hydrogen, alkyl or phenylalkyl; and

A_1 and A_2 each is an α-amino or α-imino acid residue joined through a peptide bond.

4,684,661

ANTI-FUNGAL HOMOPROPARGYLAMINES, COMPOSITIONS, AND METHOD OF USE THEREFOR

Anton Stuetz, Maria-Enzersdorf, Austria, assignor to Sandoz Ltd., Basel, Switzerland

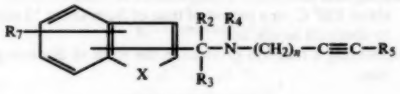
Filed Nov. 20, 1985, Ser. No. 799,807

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1984, 3442529; Aug. 10, 1985, 3528736

Int. Cl.[4] A61K *31/34, 31/38, 31/40, 31/445;* **C07D** *403/04, 405/04, 409/04*

U.S. Cl. 514—443 **15 Claims**

1. A compound of the formula:



wherein

X is O, S, OCH_2 or SCH_2,

n is 2 or 3,

R_2 is H or C_{1-4}alkyl, either

R_3 and R_4, independently, are H or C_{1-4}alkyl, or

R_3 and R_4 together are $(CH_2)_u$, in which u is a number of 3 to 5, and

R_5 is H, C_{3-6}alkenyl or is a group selected from C_{1-12}alkyl, tri(C_{1-12}alkyl)silyl, di(C_{1-12}alkyl)phenylsilyl, phenyl, phenyl(C_{1-12}alkyl) and C_{3-6}cycloalkyl, in which the alkyl, phenyl and cycloalkyl groups or moieties are unsubstituted or substituted by OH, C_{1-4}alkyl, C_{1-4}alkoxy, phenyl or halogen,

R_7 is H, halogen, CF_3, C_{1-4}alkyl or C_{1-4}alkoxy,

in free base or acid addition salt form.

12. An agricultural composition for combatting phytopathogenic fungi comprising an agriculturally acceptable diluent and a fungicidally effective amount of a compound of claim **1**, in free form or in agriculturally acceptable acid addition salt form.

13. A method of combatting phytopathogenic fungi which comprises applying to the fungi or the locus thereof, a fungicidally effective amount of a compound according to claim **1** in free form or in agriculturally acceptable acid addition salt form.

4,684,662

DISUBSTITUTED PROLINE DERIVATIVES

Rainer Henning, Frankfurt am Main, and Hansjörg Urbach, Kronberg/Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

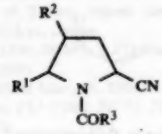
Filed Jan. 5, 1984, Ser. No. 568,423

Claims priority, application Fed. Rep. of Germany, Jan. 7, 1983, 3300316

Int. Cl.[4] C07D *209/18, 209/52*

U.S. Cl. 548—452 **5 Claims**

1. A compound of the formula I



(I)

in which

R^1 and R^2 together represent one of the chains $-(CH_2)_n-$ or $-(CH_2)_p-CH=CH-(CH_2)_q$, n, p and q each being an integer, n being 3–6 and (p+q) being 1–4, and

R^3 denotes a straight-chain or branched alkyl having 1 to 5 carbon atoms or (C_6 to C_{10})-aryl wherein the two rings in the compound of formula I are linked together trans.

4,684,663

BIOCIDAL TRIBUTYLTIN COMPOUNDS

Hans Plum, Hamm, and Horst Landsiedel, Froendenberg, both of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

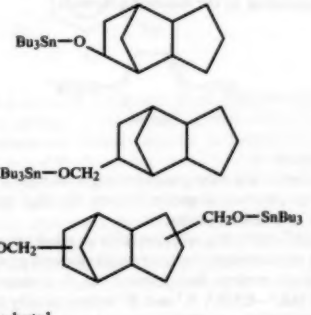
Filed Apr. 28, 1986, Ser. No. 856,347

Claims priority, application Fed. Rep. of Germany, May 9, 1985, 3516695

Int. Cl.[4] C07F *7/22;* **A01N** *55/04;* **A61K** *31/32*

U.S. Cl. 514—493 **5 Claims**

1. A tri-n-butylstannyloxy tricyclodecane of the formula



wherein Bu is n-butyl.

5. A biocidal agent comprising a biocidally effective amount of a compound as in claim **1** together with an inert carrier therefor.

4,684,664

DERIVATIVES OF β-(4-ISOCYANO-1,2,3,4-DIEPOXYCYCLOPENTYL) ACRYLIC ACID

Katsuhisa Osugi; Isao Ichinose; Eisaku Takahashi, and Masato Arahira, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 16, 1985, Ser. No. 692,104

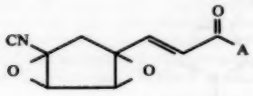
Claims priority, application Japan, Jan. 23, 1984, 59-9876; Jan. 23, 1984, 59-9877

Int. Cl.[4] A61K *31/335, 31/43;* C07D *499/32, 265/30, 495/14, 303/06*

U.S. Cl. 514—475 8 Claims

1. β-(4-isocyano-1,2-3,4-diepoxycyclopentyl)acrylamide.

2. A pharmaceutical composition having antibacterial activity, antifungal activity or antimycoplasmal activity in dosage unit form which comprises a dosage effective to produce the activities of a derivative of β-(4-isocyano-1,2-3,4-diepoxycyclopentyl)acrylic acid represented by formula (I):



(I)

wherein the derivative is β-(4-isocyano-1,2-3,4-diepoxycyclopentyl)acrylamide.

4,684,665

SEBOSUPPRESSIVE BENZOIC ACID ESTER DERIVATIVES AND COSMETIC PREPARATIONS CONTAINING THEM

Hinrich Moeller, and Siegfried Wallat, both of Monheim, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Fed. Rep. of Germany

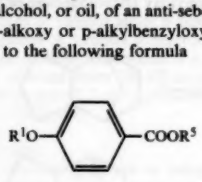
Filed Jan. 10, 1986, Ser. No. 818,648

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1985, 3500971

Int. Cl.[4] C07C *69/76*

U.S. Cl. 514—543 21 Claims

1. A sebosuppressive cosmetic composition containing a solution, mixture, or dispersion, in a base comprising at least one of water, alcohol, or oil, of an anti-seborrheically effective amount of a p-alkoxy or p-alkylbenzyloxy benzoic acid ester corresponding to the following formula



(I)

wherein R^1 is

(i) a branched alkyl group having from 6 to 18 carbon atoms,

(ii) an alkylbenzyl group wherein the alkyl moiety has from 3 to 9 carbon atoms, or

(iii) R^2—(O—Y)$_n$ wherein R^2 is an alkyl group having from 6 to 18 carbon atoms, or an alkylbenzyl group wherein the alkyl moiety has from 3 to 9 carbon atoms; Y is CHR^3—CHR^4; R^3 and R^4 independently represent a hydrogen or a methyl, and n=1 or 2;

and R^5 is an alkyl group having from 1 to 4 carbon atoms, or a methoxy alkyl, an ethoxyalkyl, or a hydroxyalkyl having from 1 to 4 carbon atoms.

4,684,666

STABILIZED LIQUID ANALGESIC COMPOSITIONS

Ronald T. Haas, Robbinsville, N.J., assignor to Haas Pharmaceuticals, Inc., Robbinsville, N.J.

Filed Aug. 19, 1986, Ser. No. 897,803

Int. Cl.[4] A61K *31/19*

U.S. Cl. 514—557 11 Claims

1. A stabilized ibuprofen-containing syrup containing from 50 to 400 mg of ibuprofen per 5 ml of syrup and comprising: a therapeutically effective amount of ibuprofen or a pharmaceutically acceptable salt or ester thereof; from 50 to 75% by weight of a water compatible bodying agent; less than 1% by weight of a stabilizer adapted to form a particulate or molecular film about the ibuprofen particles; an alkalinizing agent in an amount suitable to provide a final composition of alkaline pH of from above 7.0 to 7.7; sufficient sweetening agent to render the syrup sweet; and from about 0.10 to 0.25% by weight of a pharmaceutically acceptable antioxidant.

4,684,667

TERTIARY AMINE RESINS AND USE THEREOF

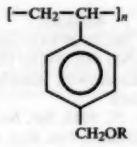
Douglas L. Hunter, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 21, 1986, Ser. No. 854,459

Int. Cl.[4] C08F *8/32*

U.S. Cl. 521—32 8 Claims

1. A process for preparing a weakly basic, solid, polymeric resinous compound having repeating units of the formula:



wherein R is an aliphatic tertiary amine and n is the number of repeating units in the polymeric structure, said process comprising:

preparing a nonaqueous solution of chloromethylated polystyrene resin and an alkoxide of an alkanolamine;

heating said solution to a temperature of from about 60° C. to about 150° C. or a period of time of from about 15 minutes to about 24 hours; and

recovering a reaction product in the form of discrete particles.

4,684,668

PROCESS FOR PRODUCING POROUS SPHERICAL POLYVINYL CHLORIDE PARTICLES

Roman B. Hawrylko, North Olmstead, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 846,163, Mar. 31, 1986, Pat. No. 4,668,707. This application Feb. 6, 1987, Ser. No. 12,761

Int. Cl.[4] C08J *9/00*

U.S. Cl. 521—56 11 Claims

1. A process for polymerizing vinyl chloride in a thickened aqueous medium comprising:

(a) charging vinyl chloride to a polymerization vessel equipped with agitation and cooling means;

(b) charging a solution comprising at least one catalyst, at least one solvent, and optionally at least one secondary surfactant, wherein said solvent has a density equal to or less than vinyl chloride and said catalyst solution has a density less than 1.0 g/cc;

(c) agitating the vinyl chloride and the catalyst solution to thoroughly mix the ingredients;

(d) reducing or stopping said agitation such that non turbulent flow is achieved;

(e) charge thickened water to the polymerization vessel

through a port near the bottom of the vessel, said water being previously mixed with at least one dispersant capable of thickening said water;
(f) forming in the polymerization vessel a bottom layer of thickened water and a top layer of vinyl chloride;
(g) increasing the agitation such that the entire polymerization medium is emulsified;
(h) conducting the polymerization of the vinyl chloride to form porous spherical shaped polyvinyl chloride resin particles, wherein said spherical shaped particles have an average shape factor greater than about 0.9 and a porosity greater than about 0.05 cc/g;
(i) removing the polymerized resin from the reaction vessel.

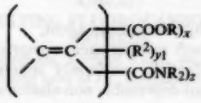
4,684,669

MODIFIED POLYPHENYLENE ETHER RESINS HAVING IMPROVED FOAMABILITY AND METHODS OF MAKING THE SAME

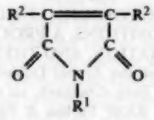
Ronald J. Wroczynski, Delmar, N.Y., assignor to General Electric Company, Selkirk, N.Y.

Filed Nov. 3, 1986, Ser. No. 926,429
Int. Cl.[4] C08J 9/10
U.S. Cl. 521—90 **13 Claims**

1. A method of producing a foam molded article comprising (a) a polyphenylene ether resin, said method comprising (I) adding to component (a) an effective amount of (b) a functionalizing modifier for (a) comprising:
(i) a compound of the formula:



wherein R is selected from alkyl, aryl, alkaryl, haloakyl, haloaryl or haloalkaryl; R^1 is selected independently from hydrogen, alkyl, aryl or alkaryl; R^2 is the same as defined for R and, in addition, hydrogen or halogen, the total number of carbon atoms in R, R^1, R^2 being up to about 50; x, y and z each being 0 or an integer selected from 1, 2, 3 or 4; x+y+z being equal to 4 and x+z being at least 2;
(ii) a compound of the formula:



wherein R^1 and R^2 are as above defined; or
(iii) a mixture of (i) and (ii); and
(c) an effective foam generating amount for components (a) and (b) of a foaming agent, and
(II) foaming said composition.

4,684,670

ULTRAVIOLET RADIATION-CURABLE SILICONE RELEASE COMPOSITIONS

Richard P. Eckberg, Saratoga Springs; Richard A. Striker, Troy, and Frank J. Modic, Schenectady, all of N.Y., assignors to General Electric Company, Waterford, N.Y.

Division of Ser. No. 757,105, Jul. 19, 1985, Pat. No. 4,608,312, which is a division of Ser. No. 527,299, Aug. 26, 1983, Pat. No. 4,558,147. This application Jun. 19, 1986, Ser. No. 876,332
Int. Cl.[4] C08F 2/50, 4/34, 30/08; C08G 77/42
U.S. Cl. 522—13 **3 Claims**

1. An ultraviolet radiation-curable silicone release coating composition comprising:
(A) a photoreactive mixed dimethylvinyl- and trimethyl-chainstopped linear polydimethyl-methylvinylmethylhydrogensiloxane terpolymer, and
(b) a small amount effective to promote photopolymerization of (i) a perbenzoate ester, (ii) a polyaromatic photosensitizer or combination of such photosensitizers, or a combination of (i) and (ii).

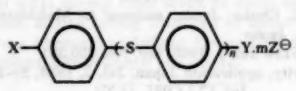
4,684,671

ENERGY BEAM CURABLE COMPOSITION

Hiroshi Tsuchiya; Kazuhiko Morio; Hisashi Murase, and Kazuo Ohkawa, all of Tokyo, Japan, assignors to Asahi Denka Kogyo K.K., Tokyo, Japan

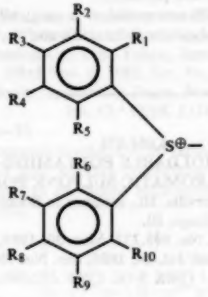
PCT No. PCT/JP86/00133, § 371 Date Apr. 9, 1986, § 102(e) Date Apr. 9, 1986
PCT Filed Mar. 18, 1986, Ser. No. 855,310
Int. Cl.[4] C08G 59/72, 59/68, 59/62
U.S. Cl. 522—31 **1 Claim**

1. An energy beam curable resin composition which comprises as essential constituents a cationically polymerizable substance and an effective amount of an onium salt of a Lewis acid represented the following formula (I)



(I)

where X is a sulfonio group represented by the following formula (II)



(II)

where R_1–R_{10} are each a hydrogen atom, halogen atom, nitro group, alkoxy group, C_1–C_{18} aliphatic group, or C_6–C_{18} substituted or unsubstituted phenyl, phenoxy, or thiophenoxy group, with at least one of R_1–R_{10} being (A) a C_1–C_{18} aliphatic group having at least one hydroxyl group or (B) a C_3–C_{19} aliphatic group having a group of —OCH_2CH_2O—;
Y is a group represented by the above formula (II), hydrogen atom, halogen atom, nitro group, alkoxy group, C_1–C_{18} aliphatic group, C_6–C_{18} substituted or unsubstituted phenyl, phenoxy, or thiophenoxy group, and n=1–3 and m=1–2; and
Z is a group represented by the formula MQ_l (III) or the formula $MQ_{l-1}OH$ (IV), where M denotes B, P, As, or Sb; Q denotes a halogen atom; and l is an integer of 4 to 6.

4,684,672

NOVEL RUBBER CONNECTORS AND OTHER RUBBER PARTS FOR USE IN HUMAN INFUSION SETS AND RUBBER

Robert L. Buchanan, 954 Mystic La., Norristown, Pa. 19403, and Henry F. Dull, Jr., 246 Park Rd., Ambler, Pa. 19002

Continuation of Ser. No. 668,222, Nov. 5, 1984, abandoned, which is a continuation-in-part of Ser. No. 457,099, Jan. 10, 1983, abandoned. This application May 13, 1985, Ser. No. 711,330

Int. Cl.[4] A61K *6/10*; C08K *5/01, 8/00*; C08L *9/00*

U.S. Cl. 523—100 12 Claims

1. A medically acceptable rubber composition to make into rubber products for contact with medical, drug and food products, said composition when cured having high tear strength and being substantially inert, said composition including at least 40% by weight of rubber comprising a mixture of brominated isobutylene-isoprene copolymer and a material selected from the group consisting of natural rubber and synthetic cis-polyisoprene, said composition further comprising a well-mixed minor amount of a polyolefin, with said composition being cured under static conditions at vulcanization temperature, and an effective amount of peroxide curing agent having been added to said composition at a lower temperature prior to curing, to achieve substantially complete cross-linking of the rubber and the polyolefin.

4,684,673

SURGICAL CEMENT FROM AMORPHOUS TRICALCIUM PHOSPHATE, POLY(CARBOXYLIC ACID) AND WATER

Toshio Adachi, Osaka, Japan, assignor to Meishintoryo Co. Ltd., Osaka, Japan

Filed Jul. 1, 1985, Ser. No. 750,301

Claims priority, application Japan, Jul. 2, 1984, 59-137000

Int. Cl.[4] C08L *33/02*

U.S. Cl. 523—116 12 Claims

1. A surgical cement consisting essentially of:

(a) a component (A) composed of self-hardening amorphous tricalcium phosphate powder;

(b) a component (B) composed of a surgically acceptable water-soluble poly(carboxylic acid); and

(c) water.

4,684,674

INJECTION MOLDABLE POLYAMIDE-IMIDE CONTAINING AROMATIC SULFONE POLYMERS

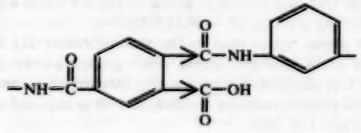
Gary T. Brooks, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation of Ser. No. 595,272, Mar. 30, 1984, abandoned. This application Jul. 24, 1985, Ser. No. 758,340

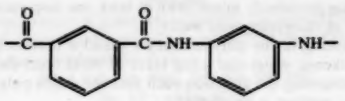
Int. Cl.[4] C08K *9/00*; C08F *283/04*

U.S. Cl. 523—205 8 Claims

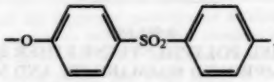
1. A composition comprising (a) about 90 to about 70 parts by weight of an amide-imide phthalamide copolymer which comprises recurring polyamide A units of:



which are capable of undergoing imidization, and polyamide B units of:



wherein the molar ratio of A units to B units is about one to one, → denotes isomerization and (b) about 10 to about 30 parts by weight of a polyethersulfone which comprises recurring units of:



4,684,675

MATTING LACQUER, PAINT AND LIGHT-TRANSMITTING MATTE FILM

Charles P. Collier, 1488 Crestline Dr., Santa Barbara, Calif. 93105

Filed Jul. 30, 1986, Ser. No. 890,500

Int. Cl.[4] C08K *7/00, 7/16*

U.S. Cl. 523—220 9 Claims

1. An improved sprayable matting lacquer providing, when set on a substrate, a paint-receptive surface, said lacquer comprising:

(a) a film-forming plastic resin agent;

(b) a relatively soft matting agent comprising a plurality of discrete substantially uniformly spherical, smooth-surfaced fingernail-depressible non-elastomeric polyethylene particles;

(c) a relatively hard matting agent comprising a plurality of discrete particles of an average diameter approximately comparable to that of said polyethylene particles and particles sufficiently hard to prevent fingernail indentation of a dried film when formed from said lacquer;

(d) an organic solvent for said film-forming agent; and,

(e) plasticizer for said film-forming agent.

4,684,676

BINDERS FOR CATHODICALLY DEPOSITABLE COATING COMPOSITIONS, A PROCESS FOR THEIR PREPARATION, AND THEIR USE

Horst Diefenbach, Nottuln; Arnold Dobbelstein, Münster, and Hans-Dieter Hille, Berg.-Gladbach, all of Fed. Rep. of Germany, assignors to BASF Farben & Fasern AG, Hamburg, Fed. Rep. of Germany

Division of Ser. No. 636,082, Aug. 1, 1984, Pat. No. 4,554,212, which is a continuation of Ser. No. 385,933, Jun. 7, 1982, abandoned. This application Aug. 30, 1985, Ser. No. 771,044

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1981, 3123536

Int. Cl.[4] C08K *3/20*

U.S. Cl. 523—411 12 Claims

1. In a binder for cathodically depositable coating compositions containing at least a cationic synthetic resin as a binder and a crosslinking agent and which are depositable on application of a voltage onto an electrically conductive substrate connected as a catode and which produce crosslinked coatings after stoving having surface quality and good corrosion protection,

the improvement consisting essentially of an aqueous binder dispersion product obtained by emulsion polymerization:

(A) 5 to 95% by weight of ethylenically unsaturated polymerizable monomers in the presence of,

(B) 95 to 5% by weight of a cationic synthetic resin consisting of a saturated cationic synthetic resin in an aqueous

phase, the total amount of components (A) and (B) being 100%,

wherein component (A) is a mixture of

(a_1) 10 to 99% by weight of an alkyl ester of acrylic acid, an alkyl ester of methacrylic acid or a mixture thereof said esters having an alkyl group containing 1 to 4 carbon atoms;

(a_2) 1 to 30% by weight of ethylenically unsaturated compounds having functional groups selected from the group consisting of derivates of esters of methyacrylic acid containing hydroxyl groups, esters of methacrylic acid having epoxide groups, esters of methacrylic acid having tertiary amino groups, esters of acrylic acid containing hydroxyl groups, esters of acrylic acid having epoxide groups, esters of acrylic acid having tertiary amino groups and mixtures thereof; and

(a_3) 0 to 80% by weight of other ethylenically unsaturated polymerizable monomers selected from the group consisting of aliphatic vinyl compounds, vinyl esters, vinyl esters of α-alkyl carboxylic acids, vinyl aromatics, acrylic monomers, and methacrylic monomers,

the total amount of the components (a_1), (a_2) and (a_3) being 100%,

and component (B) is a resin containing epoxide groups said resin comprising bisphenol A as a reactant, and said resin having been reacted with compounds selected from the group consisting of amines, ammonium salts, sulfide/acid mixtures, phosphine/acid mixtures or mixtures thereof.

4,684,677

THERMOSETTING FLUOROCARBON POLYMER PRIMERS

Clark A. Higginbotham, Crystal Lake, and James W. Wichmann, Schaumburg, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Feb. 13, 1986, Ser. No. 828,980
Int. Cl.[4] C08L *27/14, 27/16, 33/14, 63/02*
U.S. Cl. 523—435 **17 Claims**

1. A rapid air drying thermosetting solvent solution primer composition comprising volatile polar organic solvent having dissolved therein a fluorocarbon polymer in an amount of from 20% to 45% of total resin solids, a solvent-soluble, hydroxy-functional copolymer of monoethylenically unsaturated monomers containing from 5% to 30% of hydroxy-functional monoethylenic monomer in an amount of from 0.7 to 1.5 parts of hydroxy-functional copolymer per part of said fluorocarbon resin, a resinous polyepoxide in an amount providing from 0.1 to 0.6 part of polyepoxide per part of said hydroxy-functional copolymer, and a curing agent reactive with hydroxy functionality for curing said hydroxy-functional acrylic copolymer and said polyepoxide, said primer being pigmented with inorganic pigment in a weight ratio with respect to the resin solids of from 0.2:1 to 0.8:1.

4,684,678

EPOXY RESIN CURING AGENT, PROCESS, AND COMPOSITION

William J. Schultz, Vadnais Heights; Gene B. Portelli, Oakdale, and Jeffrey P. Tane, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 739,237, May 30, 1980, abandoned. This application Feb. 18, 1986, Ser. No. 830,552
Int. Cl.[4] C08G *59/50*
U.S. Cl. 523—466 **40 Claims**

1. An epoxy resin composition comprising

(a) at least one aromatic polyepoxide, and

(b) at least one 9,9-bis(aminophenyl)fluorene curing agent present in an amount sufficient to provide in the range of 0.1 to 1.1 amino groups, —NHR, per epoxy group in said aromatic polyepoxide, wherein each R is independently hydrogen or a linear or branched alkyl group of 1 to 6 carbon atoms.

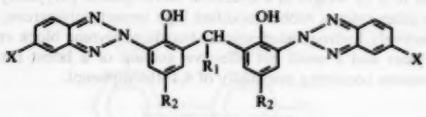
4,684,679

POLYACETAL RESIN COMPOSITIONS HAVING IMPROVED RESISTANCE TO DETERIORATION WHEN EXPOSED TO LIGHT AND CONTAINING ALKYLIDENE BIS(BENZOTRIAZOLYL PHENOLS)

Naohiro Kubota, Ageo, and Atsushi Nishimura, Washinomiya, both of Japan, assignors to Adeka Argus Chemical Co., Ltd., Urawa City, Japan

Filed Jan. 6, 1986, Ser. No. 816,524
Claims priority, application Japan, Jan. 14, 1985, 60-4717
Int. Cl.[4] C08K *5/34*
U.S. Cl. 524—91 **28 Claims**

1. A polyacetal resin composition having improved resistance to deterioration when exposed to light, comprising a polyacetal resin and an alkylidene bis(benzotriazolyl phenol) having the formula:



wherein:

R_1 is selected from the group consisting of hydrogen and alkyl having from about one to about eleven carbon atoms;

R_2 is selected from the group consisting of alkyl having from one to about twelve carbon atoms; and arylalkyl having from seven to about eighteen carbon atoms; and

X is selected from the group consisting of hydrogen; halogen; alkyl having from one to about twelve carbon atoms; aryl alkyl having from seven to about eighteen carbon atoms; alkoxy having from one to about twelve carbon atoms; phenoxy; arylalkoxy having from seven to about eighteen carbon atoms; and phenyl.

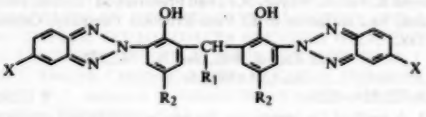
4,684,680

THERMOSETTING SYNTHETIC RESIN LACQUER COMPOSITIONS HAVING IMPROVED LIGHT STABILITY

Naohiro Kubota, Ageo; Toshihiro Shibata, Omiya, and Atsushi Nishimura, Washinomiya, all of Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1985, Ser. No. 795,309
Claims priority, application Japan, Nov. 7, 1984, 59-234372
Int. Cl.[4] C08K *5/34*
U.S. Cl. 524—91 **24 Claims**

1. Thermosetting synthetic resin lacquer compositions having improved light stability comprising a thermosetting synthetic resin and an alkylidene bis(benzotriazolyl phenol) having the formula:



wherein:

R_1 is selected from the group consisting of hydrogen and alkyl having from one to about twelve carbon atoms;

R_2 is selected from the group consisting of alkyl having from one to about twelve carbon atoms, and arylalkyl having from seven to about sixteen carbon atoms;

X is selected from the group consisting of hydrogen, halogen, alkyl having from one to about twelve carbon atoms, aryl having from six to ten carbon artoms, arylalkyl having from seven to about sixteen carbon atoms, alkoxy having from one to about twelve carbon atoms, aryloxy

having from six to ten carbon atoms and arylalkoxy having from seven to about sixteen carbon atoms.

4,684,681

FLOW ENHANCED POLYPHENYLENE ETHER RESIN COMPOSITIONS

Gim F. Lee, Jr., Albany, N.Y., and Walter K. Olander, Mt. Vernon, Ind., assignors to General Electric Company, Selkirk, N.Y.

Continuation of Ser. No. 337,424, Jan. 6, 1982, abandoned. This application Feb. 19, 1985, Ser. No. 702,464
Int. Cl.[4] C08K 5/52
U.S. Cl. 524—127 9 Claims

1. A thermoplastic molding composition containing more than 10% by weight of a structural thermoplastic polyphenylene ether resin, a rubber modified high impact polystyrene, a selectively hydrogenated styrene-butadiene-styrene block copolymer and a small but effective amount of a latent flow promoter consisting essentially of 4,4'-thiodiphenol.

4,684,682

FLAME RETARDANT FLEXIBILIZED POLYPHENYLENE ETHER COMPOSITIONS

Gim F. Lee, Jr., Albany, N.Y., assignor to General Electric Company, Selkirk, N.Y.

Continuation of Ser. No. 197,933, Oct. 17, 1980, abandoned. This application Apr. 26, 1984, Ser. No. 603,663
Int. Cl.[4] C08K 5/52
U.S. Cl. 524—141 2 Claims

1. A flame retardant thermoplastic composition which comprises, in admixture:

(a) a normally flammable polyphenylene ether resin;

(b) a flame retardant aromatic phosphate plasticizer in an amount at least sufficient to provide a flexibilized composition after molding; and

(c) a thermoplastic elastomer comprising an A-B-A[1] block copolymer wherein terminal blocks A and A[1] are polymeric units of a vinyl aromatic compound and center block B is a polymer of a conjugated diene which also includes:

a minor proportion of elemental red phosphorus, sufficient to enhance the flame retardant capability of aromatic phosphate component (b).

4,684,683

INJECTION BLOW MOLDING GRADE PROPYLENE POLYMERS

Harold K. Ficker, Wayne, N.J., and Frederick M. Teskin, Herndon, Va., assignors to El Paso Products Company, Odessa, Tex.

Filed Aug. 6, 1985, Ser. No. 762,902
Int. Cl.[4] C08K 5/09, 5/20
U.S. Cl. 524—220 6 Claims

1. A method for improving the processability and clarity of an undeashed propylene polymer prepared in the presence of a high-activity catalyst composition containing a magnesium halide-supported titanium halide catalyst component which comprises:

(a) adding sodium benzoate, from about 0.01 to about 1 wt. % of N,N[1]-ethylene bisstearamide and from about 0.05 to about 0.5 wt.% of an ethoxylated amine to the polymer in the absence of calcium stearate the percentages being based on the weight of the polymer,

(b) melting the resulting mixture and

(c) solidifying the melted mixture.

4,684,684

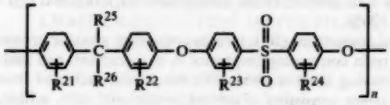
THERMOPLASTIC RESIN COMPOSITION HAVING IMPROVED MOLDABILITY COMPRISING HOMOGENEOUS BLENDS OF THE RESIN WITH DIAMIDES

Katsuhiro Abe; Yoshinobu Kobayashi, and Mitsushige Baba, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Mar. 7, 1985, Ser. No. 709,206
Claims priority, application Japan, Mar. 15, 1984, 59-49571
Int. Cl.[4] C08K 5/20
U.S. Cl. 524—227 17 Claims

1. A thermoplastic resin composition having improved moldability, comprising:

(i) 100 parts by weight of an amorphous thermoplastic resins, excluding resins having polyphenylene ether as the main component, and which is at least one member selected from the group consisting of polystyrenes, polycarbonates, polynorbornene resins, polyarylates, polysulfones of the following formula:



wherein R^{21}, R^{22}, R^{23} and R^{24} each independently represent a hydrogen atom or a hydrocarbon residue having 1 to 8 carbon atoms, R^{25} and R^{26} each independently represent a hydrogen atom, a halogen atom, or a hydrocarbon residue having 1 to 6 carbon atoms, and n is at least 30, and modification products obtained by graft-modification of these polymers, and

(ii) 0.5 to 25 parts by weight of a diamide compound of the formula:

$$R^2—NHCO—R^1—CONH—R^3$$

homogeneously blended with component (i), wherein R^1 is a linear or branched, saturated or unsaturated aliphatic hydrocarbon residue having 1 to 10 carbon atoms, an aromatic hydrocarbon residue having 6 to 10 carbon atoms, or a derivative thereof, and R^2 and R^3 which may be the same or different, each represent a linear or branched, saturated or unsaturated aliphatic hydrocarbon residue having 1 to 10 carbon atoms, a saturated or unsaturated alicyclic hydrocarbon residue having 3 to 10 carbon atoms, an aromatic hydrocarbon residue having 6 to 10 carbon atoms, or a derivative thereof.

4,684,685

READHERING AND REMOVABLE ADHESIVE

Ralph J. Shuman, Needham, and Barbara Burns, Auburn, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Continuation-in-part of Ser. No. 822,505, Jan. 27, 1986, Pat. No. 4,644,026, which is a continuation-in-part of Ser. No. 756,870, Jul. 18, 1985, Pat. No. 4,657,960. This application Aug. 25, 1986, Ser. No. 900,112
The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.
Int. Cl.[4] C08L 7/00
U.S. Cl. 524—270 28 Claims

1. A gelled adhesive product in solid form comprising:

a rubber component; a water soluble or water dispersible tackifying agent; and a gelling agent; said gelled adhesive product having the combination of properties resulting in an adhesive coatable onto a substrate surface area by gliding the adhesive product over the substrate surface, the adhesive having sufficient tack permitting the adhesive coated area on said substrate to immediately adhere to

a solid contact surface as said adhesive coated substrate is pressed against the contact surface, the adhesive also having sufficient release property permitting removal of said adhesive coated substrate from said contact surface upon lifting the coated substrate from the contact surface, said adhesive having the additional property permitting said same adhesive coated substrate to readhere to a solid contact surface upon pressing said same coated substrate thereto without applying additional adhesive.

4,684,686

GLASS FIBER REINFORCED POLYESTER MOLDING COMPOSITIONS CONTAINING METAL POWDERS

Leonard R. Hepp, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.

Filed Feb. 25, 1985, Ser. No. 705,438

Int. Cl.[4] C08K *7/14, 3/08;* **C08L** *67/02*

U.S. Cl. 524—281 **16 Claims**

1. A poly(1,4-butylene terephthalate) thermoplastic molding composition exhibiting at least improved flexural properties and melt viscosity comprising:

(a) a thermoplastic poly(1,4-butylene terephthalate) resin which remains thermoplastic during formulation and processing of said composition;

(b) a reinforcing amount of glass fiber reinforcement; and

(c) an effective amount of particulate metal to improve at least the flexural properties and melt viscosity of said thermoplastic poly(1,4-butylene terephthalate) resin and reinforcing amount of glass fiber reinforcement, said amount being from at least about 0.1 parts by weight of said metal for each 70 parts by weight of resin and not exceeding about 1.0 parts by weight of said metal for each 70 parts by weight of resin.

2. The molding composition of claim 1 which additionally comprises a flame retarding amount of halogenated aromatic flame retardant.

3. The molding composition of claim 2 which additionally comprises an effective amount of antimony compound synergist.

4,684,687

CHEMICAL AND HEAT RESISTANT RUBBER COMPOSITION

William D. Breach, Humble, and Edwin W. Vaclavik, Houston, both of Tex., assignors to Hydril Company, Houston, Tex.

Continuation-in-part of Ser. No. 709,514, Mar. 7, 1985, Pat. No. 4,575,522. This application Dec. 13, 1985, Ser. No. 808,528

Int. Cl.[4] C08K *3/04, 5/13*

U.S. Cl. 524—291 **13 Claims**

1. An elastic and chemical resistant rubber composition comprising a peroxide crosslinked ethylene propylene copolymer; an effective amount of metal salts of dithiocarbamate; an effective amount of sterically hindered phenol; minor effective amounts of coagent to peroxide crosslinking; and carbon black of a particle size of about 13 nm to about 15 nm used in about 25 to about 100 parts per weight of copolymer.

4,684,688

UV STABILIZER FOR POLYACETYLENIC RECORDING MEDIA

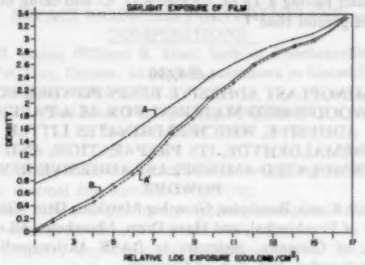
Mark L. Moskowitz, Wayne, N.J., assignor to GAF Corporation, Wayne, N.J.

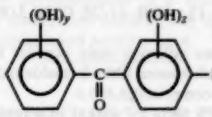
Filed Aug. 25, 1986, Ser. No. 900,120

Int. Cl.[4] G03C *1/00;* **C08K** *5/13*

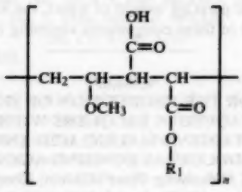
U.S. Cl. 524—336 **8 Claims**

1. A recording film coating composition comprising one part by weight of a hydroxylated benzophenone having the structure





wherein y and z each have a value of 0–2 and the sum of y+z is at least 1 and R_2 is hydrogen, C_1 to C_4 alkyl or C_1 to C_4 alkoxy, and between about 10 and about 40 parts by weight of a vinyl ether/maleic acid ester copolymer having the structure



wherein n is an integer having a value of from 10 to 1,000; and R_1 is alkyl having from 1 to 6 carbon atoms, said composition dissolved in an inert solvent to provide a clear colorless solution.

4. The process which comprises coating a radiant energy exposed and imaged polyacetylenic recording film with an effective UV development inhibiting amount of the composition of claim 1.

4,684,689

COMPOSITIONS FOR DIELECTRIC SEALING APPLICATIONS COMPRISING TERPOLYMER EMULSIONS OF ETHYLENE, VINYL ESTERS AND N-METHYLOL COMONOMERS BLENDED WITH PVC EMULSIONS BUFFERED AT A PH GREATER THAN 7

Marie E. Yannich, Cranbury, and Howard G. Katz, Hightstown, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Jun. 2, 1986, Ser. No. 869,560

Int. Cl.[4] C08K *3/20, 5/06;* **C08J** *3/02;* **C08F** *6/14*

U.S. Cl. 524—371 **11 Claims**

1. A binder suitable for dielectric sealing may be prepared comprising a blend of a polyvinyl halide emulsion and an aqueous emulsion comprising a vinyl ester of an alkanoic acid interpolymerized with

(a) 5 to 28% by weight of ethylene;

(b) 0.5 to 4% by a weight of an N-methylol containing copolymerizable monomer:

(c) 0 to 3% by weight of a latex stabilizer; and

(d) 0 to 1% by weight of at least one polyunsaturated copolymerizable monomer,

the binder having a Tg of −15 to +35° C. and being buffered to a pH greater than 7.

4,684,690

AMINOPLAST ADHESIVE RESIN POWDER FOR WOOD-BASED MATERIALS OR AS A PAPER ADHESIVE, WHICH ELIMINATES LITTLE FORMALDEHYDE, ITS PREPARATION, AND A FORMULATED AMINOPLAST ADHESIVE RESIN POWDER

Friedrich Kraus, Bensheim; Guenther Matthias; Otto Wittmann, both of Frankenthal, and Hans Diem, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 20, 1986, Ser. No. 876,758

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1985, 3522358

Int. Cl.⁴ C08L *61/28;* C08K *3/30*

U.S. Cl. 524—419 **9 Claims**

1. An aminoplast adhesive resin powder for wood-based materials, which eliminates little formaldehyde, wherein the resin is a mixture comprising

(a) from 40 to 75 parts by weight of a urea/formaldehyde resin having a molar ratio of urea to formaldehyde of from 1:1.4 to 1:2,

(b) from 10 to 20 parts by weight of a melamine/formaldehyde resin having a molar ratio of melamine to formaldehyde of from 1:1.3 to 1:3,

(c) from 15 to 25 parts by weight of milled urea and

(d) from 0.3 to 10 parts by weight of a flow improver, as well as up to 10 parts by weight of water, the number of parts by weight of these components summing to 100.

4,684,691

PROCESS FOR THE PRODUCTION OF SICCATIVATED AQUEOUS LACQUERS WITH POLYBUTADIENE/MALEIC ACID ANHYDRIDE ADDUCTS AS BONDING AGENT

Hans G. Stahl, Oldenburg; Peter Höhlein, Kempen; Hans-Joachim Traenckner, Fallingbostel; Lothar Fleiter, Krefeld, and Jürgen Schwindt, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 22, 1985, Ser. No. 757,800

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1984, 3428495

Int. Cl.⁴ C08L *51/00*

U.S. Cl. 524—534 **2 Claims**

1. A process for the production of siccativated aqueous lacquers, the bonding agent of which is a partially neutralized resin, which consists of

A. from 40 to 70% by weight of polybutadiene,

B. from 7 to 20% by weight of maleic acid anhydride., up to half the weight of which can be replaced by semi-drying or drying oils,

C. from 10 to 35% by weight of graft monomer and

D. from 3 to 10% by weight of monoalcohol or monoamine based, in each case, on the sum of the components A, B, C and D,

the carboxyl groups of this resin, which correspond before neutralization to an acid number of from 40 to 160, being neutralized from 20 to 80%,

characterised in that the production of the resin from the components A to D takes place without addition of water and that from 1 to 8% by weight, based on unneutralized resin, of the aqueous dispersion of a siccative is added to the aqueous phase consisting of water, base and optionally component D and optionally auxiliary before dispersion of the resin of A, B, C and optionally D, with the proviso that this siccative dispersion contains

(a) from 15 to 20% by weight of water-insoluble siccative,

(b) from 10 to 20% by weight of water-miscible organic solvent,

(c) from 1 to 20% by weight of emulsifier and

(d) from 40 to 74% by weight of water, based, in each case, on the aqueous siccative dispersion.

4,684,692

FLAME-RETARDANT MOLDED COMPOSITION WHICH INCORPORATES A POLY(STYRENE-CO-N-PHENYLMALEIMIDE-CO-DIBROMOSTYRENE) COPOLYMER

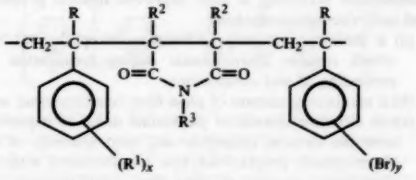
Usama E. Younes, Newtown Square, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 685,362, Dec. 24, 1984. This application Dec. 16, 1986, Ser. No. 942,114

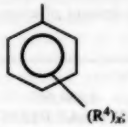
Int. Cl.⁴ C08F *214/6;* C08L *39/04*

U.S. Cl. 524—548 **2 Claims**

1. A foamed copolymer comprised of the following recurring units:



wherein each R separately represents —H, —CH_3, or —CH_2CH_3; R^1 represents —CH_3, —CH_2CH_3, —$CH(CH_3)_2$, —$C(CH_3)_3$, —OH, —NH_2, —OCH_3, —CO_2H, —$CONH_2$, or —$CON(CH_3)_2$; each R^2 separately represents —H or —CH_3; R^3 represents a C_1 to C_4 alkyl group, a chlorine or bromine substituted C_1 to C_4 alkyl group, or



R^4 represents —CH_3, —CH_2CH_3, —$CH(CH_3)_3$, —Cl, —Br, —OH, —NH_2, —OCH_3, —CO_2H, —$CONH_2$, or —$CON(CH_3)_2$; x represents an integer of from 0 to 3, and wherein y represents an integer of from 1 to 3.

4,684,693

THERMOSETTABLE POLYMER OR PREPOLYMER PREPARED FROM HETEROCYCLIC MATERIALS CONTAINING A NITROGEN ATOM AND CARBOXYLIC ACID MONO- OR DIANHYDRIDE WITH N,N'-BIS-IMIDE

Loren L. Swearingen, Freeport; Jimmy D. Earls, and Randy J. LaTulip, both of Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 754,697, Jul. 15, 1985, Pat. No. 4,647,616. This application Feb. 28, 1985, Ser. No. 835,021

Int. Cl.⁴ C08G *16/02*

U.S. Cl. 524—600 **77 Claims**

1. A thermoset product resulting from subjecting to conditions sufficient to effect curing to a thermoset condition a composition comprising

(I) a N,N'-bis-imide and

(II) a thermosettable polymer or prepolymer prepared by reacting

(A) a heterocyclic material containing at least one aromatic ring and one nitrogen atom therein or mixture of

any two or more of such materials having at least one reactive substituent group having at least one reactive hydrogen atom attached to a carbon atom attached to the heterocyclic ring with the proviso that at least one of such heterocyclic materials has at least two reactive hydrogen atoms attached to a carbon atom attached to the ring; with

(B) at least one cycloaliphatic or aromatic carboxylic acid monoanhydride or dianhydride; and

wherein the reactants are employed in quantities which provide a mole ratio of (II-A) to (II-B) of from about 0.25:1 to about 4:1; and wherein said polymer or prepolymer has a softening point below 300° C.

4,684,694

TRANSPARENT COATING LAYER WITH SELF-REPAIRNG AND FOG-RESISTANT PROPERTIES WHICH CAN BE UTILIZED ON PANES

Kornelia Breuer, Aldenhoven; Udo Gelderie, Stolberg; Gerhard Holzer, and Helmer Raedisch, both of Aachen, all of Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage, Courbevoie, France

Filed Dec. 6, 1985, Ser. No. 805,802

Claims priority, application France, Dec. 6, 1984, 84 18602

Int. Cl.[4] C08G *18/72*

U.S. Cl. 524—730 **17 Claims**

1. Transparent polyurethane coating layer with self-repairing properties for glass and/or plastic material panes, formed from a reactive mixture consisting essentially of 10–25% by weight of a trifunctional isocyanate component and 90–25% by weight of a plurifunctional polyalcohol component, wherein said isocyanate component consists essentially of 10 to 75% by weight of a biuret or isocyanurate of 1,6 hexamethylenediisocyanate consisting of about 15 to 25% by weight of NCO radicals and having an average molecular weight between about 450 and 850 and said polyalcohol component consists essentially of a plurifunctional polyalcohol comprised of about 0.4 to 17% by weight of OH radicals and having an average molecular weight between about 200 and 15,000, as well as ethoxy-propoxy chains comprised about 50 to 90% by weight of ethoxy radicals and about 10 to 50% by weight of propoxy radicals in the ethoxy-propoxy chains.

4,684,695

FLAME-RETARDANT, UNSATURATED POLYESTER RESIN AND COMPOSITION THEREFOR

Junji Oshima, Toyonaka; Minoru Yamada, and Yasuyuki Kajita, both of Kawanishi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 651,036, Sep. 14, 1984, abandoned. This application Nov. 12, 1985, Ser. No. 796,504

Claims priority, application Japan, Sep. 29, 1983, 58-182559

Int. Cl.[4] C08L *67/06*

U.S. Cl. 525—36 **4 Claims**

1. A flame-retardant, unsaturated polyester resin composition, which comprises (1) a halogen-containing unsaturated polyester obtained by halogenating an unsaturated polyester prepared by the reaction of (a) dicyclopentadiene, its amount being in the range of about 40 to 80 mole % to the total acid component, (b) α,β-ethylenically unsaturated dicarboxylic acid or its anhydride, its amount being in the range of about 40 to 90 mole % of the total acid component, (c) tetrahydrophthalic acid or its anhydride, its amount being in the range of about 10 to 60 mole % of the total acid component and (d) polyhydric alcohol, the reaction being carried out such that about 100 to 150 mole % to dicyclopentadiene of the component (b) or the components (b) and (c) is added to allow dicyclopentadiene to undergo reaction in advance at a temperature of not higher than about 160° C. and then the resulting product is reacted with polyhydric alcohol and the remaining amounts of the component (b) or (c), and (2) a crosslinkable monomer.

4,684,696

IMPACT MODIFIED POLYPHENYLENE COMPOSITIONS

Gary M. Bates; William R. Haaf, both of Voorheesville, and Sai-Pei Ting, Delmar, all of N.Y., assignors to General Electric Company, Selkirk, N.Y.

Filed Mar. 14, 1986, Ser. No. 839,406

Int. Cl.[4] C08L *71/04*

U.S. Cl. 525—68 **15 Claims**

1. A thermoplastic resin composition having improved resistance to thermal degradation comprising:

a. a base resin comprising a polyphenylene ether resin with or without an alkenyl aromatic resin; and

b. a property improving amount of an impact modifying agent core-shell structure consisting essentially of a crosslinked acrylate core and an interpenetrating, essentially graft-free crosslinked styrenic shell wherein the agent is prepared by polymerization of a styrene with polyethylenically unsaturated cross-linking agent in the presence of the crosslinked acrylate core.

4,684,697

COMPOSITIONS BASED ON SILANE HYDROLYZATES AND VINYL POLYMERS CONTAINING HYDROLYZABLE SILYL GROUPS

Wen-Hsuan Chang, Gibsonia; William P. Blackburn, Evans City; Paul J. Prucnal, Pittsburgh, and Edward L. Dufford, Sarver, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 728,968, Apr. 30, 1985, Pat. No. 4,604,443, and Ser. No. 728,973, Apr. 30, 1985. This application Jul. 2, 1986, Ser. No. 881,434

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—100 **26 Claims**

1. A moisture-curable composition comprising:

(A) an ungelled partial hydrolysis product of an organosilicon-containing material, said organosilicon-containing material comprising greater than or equal to 10 mole percent of at least one organosilane compound corresponding to the formula R—Si—Y_3 in which R represents hydrogen, or a C_1–C_{10} group joined to Si through an Si—C linkage, and each Y independently represents an easily hydrolyzable group, wherein said partial hydrolysis product is prepared by hydrolyzing said easily hydrolyzable groups of said organosilane compound with water wherein the amount of water is determined according to the following formula

$$(E_{1,2}\times 0.5)+(E_{3,4}\times Z)=W,$$

wherein

W represents the total moles H_2O employed calculated on total equivalents of said easily hydrolyzable groups given that one equivalent of said easily hydrolyzable groups corresponds to 1 mole of said easily hydrolyzable groups employed,

$E_{1,2}$ represents the total number of equivalents of Y employed from organosilane compounds containing one or two Y groups,

$E_{3,4}$ represents the total number of equivalents of Y employed from organosilane compounds containing three or four Y groups, and

Z is a number in the range of from 0.023 to 0.43;

provided that said organosilicon-containing material has an average functionality of equal to or greater than 2.4 based on easily hydrolyzable Y groups attached to silicon atoms of organosilane compounds containing easily hydrolyzable Y groups present in said organosilicon-containing material but excluding easily hydrolyzable Y groups attached to silicon atoms of organosilane compounds having only 1 easily hydrolyzable Y group which may be present in said organosilicon-containing material; and

(B) an acrylic addition interpolymer containing at least one silicon atom directly bonded to a hydrolyzable group.

4,684,698

WATER SOLUBLE MULTICOMPLEX OF CHLOROTHIAZIDE, FUROSEMIDE AND POLY(N-VINYL-2-PYRROLIDONE)

Eugene S. Barabas, Watchung, N.J., assignor to GAF Corporation, Wayne, N.J.

Filed May 2, 1986, Ser. No. 858,978
Int. Cl.[4] C08F *8/34*
U.S. Cl. 525—326.9 7 Claims

1. The water soluble chlorothiazide-furosemide-poly(N-vinyl-2-pyrrolidone) homopolymer complex.

4,684,699

ALLOYS OF A POLY(ARYLENE SULFIDE) AND A POLY(ARYL KETONE)

Lloyd M. Robeson, Whitehouse Station, N.J., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 249,006, Mar. 30, 1981, abandoned. This application May 6, 1983, Ser. No. 492,123
Int. Cl.[4] C08L *61/02, 81/04*
U.S. Cl. 525—471 12 Claims

1. An alloy comprising from about 2 to about 98 weight percent of a poly(arylene sulfide) and from about 98 to about 2 weight percent of a crystalline poly(aryl ether ketone).

4,684,700

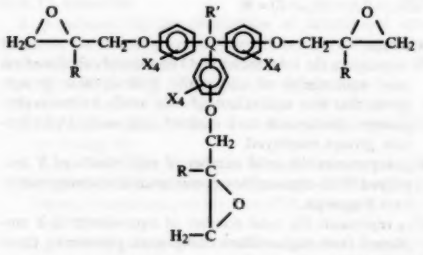
ADVANCED EPOXY RESINS PREPARED FROM TRIGLYCIDYL ETHERS AND DIHYDRI PHENOLS

Chun S. Wang; Wuu N. Chen, both of Lake Jackson; Robert L. Bowden, Angleton, and Jody R. Berman, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 14, 1986, Ser. No. 829,364
The portion of the term of this patent subsequent to Aug. 5, 2003, has been disclaimed.
Int. Cl.[4] C08G *59/32*
U.S. Cl. 525—481 120 Claims

1. Advanced, solid, non-sintering epoxy resin which results from reacting (A) at least one triglycidyl ether of a trihydric phenol represented by the following formula I

I.



wherein Q is a tetravalent hydrocarbyl group having 1 carbon atom, each R is independently hydrogen or an aliphatic hydrocarbyl group having from 1 to about 3 carbon atoms; each R′ is hydrogen or a hydrocarbyl group having from 1 to about 12; and each X is independently hydrogen, a monovalent hydrocarbyl group having from 1 to about 6carbon atoms or a halogen; with (B) at least one polyhydric phenol having an average hydroxyl functionality of not greater than about 3; wherein components (A) and (B) are employed in quantities which result in a non-sintering advanced epoxy resin.

4,684,701

METHOD FOR PREPARING ADVANCED EPOXY OR PHENOXY RESINS WITH LOW ALIPHATIC HALIDE CONTENT

Chun S. Wang, Lake Jackson; Robert L. Bowden, Angleton, and Wuu N. Chen, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 829,362, Feb. 14, 1986, abandoned. This application Sep. 24, 1986, Ser. No. 911,197
Int. Cl.[4] C08G *59/14*
U.S. Cl. 525—507 9 Claims

1. A process for preparing advanced epoxy resins having a low total aliphatic halide content which process comprises subjecting a mixture consisting essentially of

(1) a material containing an average of more than one 1,2-epoxy group per molecule and which contains aliphatic halide moieties;

(2) a material containing an average of more than one aromatic hydroxyl group per molecule;

(3) at least one inert liquid diluent or solvent for components (1) and (2) which do not contain an aliphatic hydroxyl-containing material;

(4) at least one material containing at least one aliphatic hydroxyl group per molecule which is free of epoxide groups; and

(5) at least one alkali metal hydroxide to conditions suitable for reacting the aromatic hydroxyl groups of component (2) with the epoxy groups of component (1) and wherein

(i) component (4) is present in an amount of from about 0.1 to about 5 percent by weight of the amount of component (1);

(ii) component (5) is present in an amount of from about 0.25 to about 10 moles per equivalent of total aliphatic halide contained in component (1); and

(iii) components (1) and (2) are employed in an amount which provides a phenolic hydroxyl group to epoxy group ratio of from 0.01:1 to about 2:1;

thereby producing an advanced product having a total aliphatic halide content lower than that contained in component (1).

4,684,702

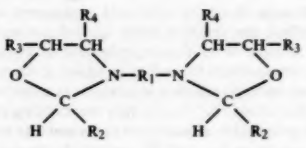
CATHODICALLY DEPOSITABLE SYNTHETIC RESIN BINDERS AND PROCESS FOR PRODUCING SAME

Willibald Paar; Georg Pampouchidis, and Helmut Hönig, all of Graz, Austria, assignors to Vianova Kunstharz, A.G., Werndorf, Austria

Filed Mar. 26, 1984, Ser. No. 593,268
Claims priority, application Austria, Mar. 28, 1983, 1070/83
Int. Cl.[4] C08F *283/00*
U.S. Cl. 525—528 20 Claims

1. Cathodically depositable synthetic resin binders, hardenable through thermal polymerization comprising (A) a modified epoxy resin component substantially water-soluble upon protonation of the basic groups, carrying basic nitrogen atoms according to an amine number of between 40 and 170 mg KOH/g and chain-end or side-chain double bonds according to a double bond number of at least 0.5 to 1000 molecular weight units (component A); and (B) a component substantially water-insoluble under the conditions of cathodic electrodeposition which is a reaction product of a hydroxy(meth)acrylate-diisocyanate-monoadduct with a oxazolidine compound or the corresponding 6-membered ring compounds (perhydro-1,3-oxazine) of the general formula

(I)



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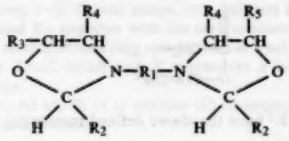
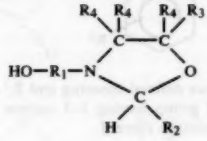
or



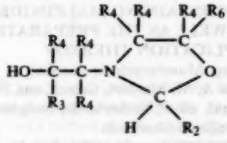
(II)

or with a reaction product of equivalent amounts of a diisocyanate with a hydroxy oxazolidine or the corresponding 6-membered ring compound of the formula



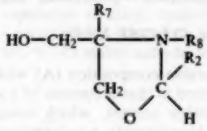
(III)

or



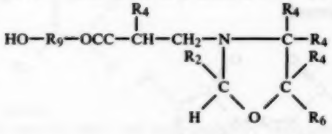
(IV)

or



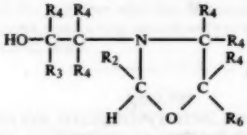
(V)

or



(VI)

or



(VII)

wherein

R_1 is a straight chain or branched or cyclic alkylene radical with from 2 to 12 C-atoms or an aralkylene radical,

R_2 is a straight chain or branched alkyl radical with from 1 to 4 C-atoms or a hydrogen atom or an aryl radical,

R_3 is a saturated or unsaturated aliphatic or cycloaliphatic or aromatic hydrocarbon radical,

R_4 is H or CH_3,

R_5 is a hydrogen atom or an alkyl radical,

R_6 is equal to R_4 or an alkyl or phenyl radical,

R_7 is a hydrogen atom or a straight chain or branched or cyclic alkyl radical with from 2 to 12 C-atoms,

R_8 is the moiety remaining after reaction with the active hydrogen atom next to the nitrogen atom and monofunctional with regard to the acrylic or methacrylic monomers, and

R_9 is a straight chain or branched alkylene or polyalkylene ether radical,

and whereby in the component (B) the moiety derived from the hydroxy(meth)acrylate on an average is present at least once per molecule.

4,684,703

POLYMERIZATION CATALYST FOR ETHYLENE HOMOPOLYMERIZATION

Burkhard E. Wagner, Highland Park; Frederick J. Karol; George L. Goeke, both of Belle Mead, all of N.J.; Robert J. Jorgensen, Dunbar, W. Va., and Nils Friis, Macungie, Pa., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 14,412, Feb. 27, 1979, abandoned, which is a continuation-in-part of Ser. No. 892,037, Mar. 31, 1978, abandoned. This application Mar. 7, 1983, Ser. No. 471,068

Int. Cl.[4] C08F *4/02, 2/34*

U.S. Cl. 526—88 **3 Claims**

1. A catalytic process for producing ethylene homopolymer with a Ti containing catalyst at a productivity of ≧50,000 pounds of polymer per pound of Ti under a pressure of <1000 psi in a gas phase fluid bed reaction

said polymer being produced in granular form and having a density of about ≧0.958 to ≦0.972 and a melt flow ratio of ≧22 to ≦32

which comprises homopolymerizing ethylene at a temperature of about 30° to 115° C. by contacting the monomer charge with, in the presence of about 0 to 2.0 mols of hydrogen per mol of ethylene in a gas phase reaction zone, particles of the catalyst formed by

(A) forming a precursor composition of the formula $Mg_mTi_1(OR)_nX_p[ED]_q$

wherein

R is C_1 to C_{14} aliphatic or aromatic hydrocarbon radical, or COR′ wherein R′ is a C_1 to C_{14} aliphatic or aromatic hydrocarbon radical,

X is selected from the group consisting of Cl, Br, I, or mixture thereof,

ED is an electron donor compound,

m is ≧0.5 to ≦56

n is 0 or 1

p is ≧6 to ≦116 and

q is ≧2 to ≦85

by dissolving at least one magnesium compound and at least one titanium compound in at least one electron donor compound so as to thereby form a solution of said precursor composition in said electron donor compound, and recovering said precursor composition from said solution,

said magnesium compound having the structure MgX_2,

said titanium compound having the structure $Ti(OR)_aX_b$ wherein a is 0 or 1, b is 2 to 4 inclusive and a+b=3 or 4

said electron donor compound being a liquid organic compound in which said magnesium compound and said titanium compound are soluble and which is selected from the group consisting of alkyl esters of aliphatic and aromatic carboxylic acids, aliphatic esters, cyclic esters and aliphatic ketones,

and said magnesium compound, said titanium compound and said electron donor compound being employed in such amounts as to satisfy the values of m, n, p and q,

(B) diluting said precursor composition with about 1 to 10 parts by weight, per part by weight of said precursor composition, of at least one inert carrier material,

(C) partially activating the precursor composition outside the polymerization zone in a hydrocarbon slurry with >0 to <10 mols of activator compound per mol of titanium in

said precursor composition, said activator compound having the structure

$$Al(R'')_cX'_dH_e$$

wherein X' is Cl or OR''', R'' and R''' are the same or different and are C_1 to C_{14} saturated hydrocarbon radicals, d is 0 to 1.5, e is 1 or 0 and c+d+e=3, and drying the mixture to remove the hydrocarbon solvent, and

(D) completely activating the precursor composition in a fluid bed polymerization zone with ≧10 to about 400 mols of said activator compound in the absence of a solvent for said precursor composition so as to avoid the need for drying the fully active catalyst to remove the solvent therefrom.

4,684,704

HYDROPHOBICALLY MODIFIED HYDROXYETHYL CELLULOSE IN AQUEOUS POLYMERIZATION DISPERSIONS

Daniel H. Craig, Hockessin, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jun. 19, 1986, Ser. No. 876,954
Int. Cl.[4] C08F *2/20*
U.S. Cl. 526—200 **10 Claims**

1. A process for the emulsion polymerization of low protective colloid-grafting potential ethylenically unsaturated monomers in the presence of a polymerization catalyst wherein the improvement comprises conducting the emulsion polymerization in the presence of from about 0.01% to about 1.7%, by weight of the total monomer content, of a hydrophobically modified hydroxyethyl cellulose having a hydrocarbon radical having from 8 to 25 carbon atoms in an amount of from about about 0.1% to about 2.0%, by weight of the hydrophobically modified hydroxyethyl cellulose, and a hydroxyethyl M.S. of from about 2.5 to about 3.5 and the emulsion polymerization process produces polymer latices having a particle size of less than 1.0 micron.

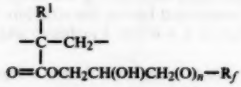
4,684,705

CONTACT LENS

Fumio Yamamoto, Nishinomiya; Takayoshi Suzuki, Kurashiki; Masahiro Ikari, Kurashiki; Susumu Saito, Kurashiki; Akira Ohmori, Ibaraki, and Takashi Yasuhara, Settsu, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

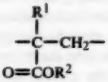
Filed Jul. 21, 1986, Ser. No. 887,206
Claims priority, application Japan, Aug. 2, 1985, 60-171586
Int. Cl.[4] C08F *18/20*
U.S. Cl. 526—246 **7 Claims**

1. Contact lenses formed of copolymers comprising 50–95 parts by weight of a structural unit represented by formula (a):



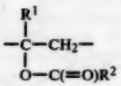
(1)

(where R^1 stands for a hydrogen atom or methyl group; Rf, a polyfluoroalkyl group having 1–15 carbon atoms and 2 to 31 fluorine atoms; and n, either 0 or 1), and 50–5 parts by weight of at least one member selected from structural units represented by formula (b):



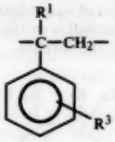
(2)

(where R^1 stands for a hydrogen or methyl group and R^2 represents an alkyl group having 1–20 carbon atoms or a polyfluoroalkyl group having 1–15 carbon atoms);



(3)

(where R^1 and R^2 have the above defined meanings); or



(where R^1 has the above defined meaning and R^3 represents a hydrogen atom, alkyl group having 1–5 carbon atoms or a halogen atom); or admixture thereof.

4,684,706

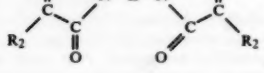
COMPOSITIONS CONTAINING MALEIMIDE-AMIDE COMPOUNDS AS WELL AS THE PREPARATION AND APPLICATION THEREOF

Adrianus J. de Koning, Munstergeleen; Jacobus A. Loontjens, Meerssen; Hubertus A. M. Mostert, Geleen, and Hubertus A. A. Omloo, Landgraaf, all of Netherlands, assignors to DSM Resins B.V., Awzwolle, Netherlands

Division of Ser. No. 650,080, Sep. 13, 1984, Pat. No. 4,582,883.
This application Jan. 29, 1986, Ser. No. 823,576
Claims priority, application Netherlands, Sep. 20, 1983, 8303229
Int. Cl.[4] C08F *226/06*
U.S. Cl. 526—262 **14 Claims**

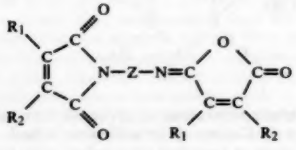
1. Homogeneous curable composition (A) with maleimide compounds, characterized in that it consists of a solution of a composition, in a suitable solvent, which composition (B) comprises a solvent, a bismaleimide, a maleimideamide and an acid anhydride, wherein said composition (B) contains:

(a) 80 to 30 wt.-% (of a mixture) of compound(s) having the general formula



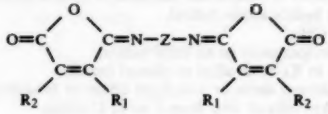
I

and/or



II

and/or

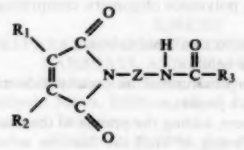


III

where

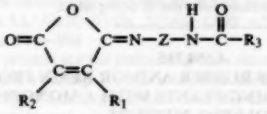
(a) R_1 and R_2 each and independently represent a hydrogen atom, an aliphatic cycloaliphatic or aromatic group containing 1–12 carbon atoms, or a halogen atom, or where R_1 and R_2, together with the carbon atoms to which they are bound, form a ring system with at least one polymerizable C=C bond and Z represents a bivalent organic group,

(b) 5 to 60 wt.-% of (a mixture of) compound(s) having the general formula



IV

and/or

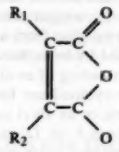


V

where

R_1 and R_2 each and independently represent a hydrogen atom, an aliphatic, cycloaliphatic or aromatic group containing 1–12 carbon atoms, or halogen atom, or where R_1 and R_2, together with the carbon atoms to which they are bound, form a ring system with at least one polymerizable C=C bond, while Z represents a bivalent, organic group, and R_3 represents an alkyl, cycloalkyl, aryl, aralykyl or alkylaryl group with 1–12 carbon atoms in the alkyl part,

(c) 1 to 10 wt.-% of a maleic anhydride derivative having the formula



VI

where

R_1 and R_2 each and independently represent a hydrogen atom, an aliphatic, cycloaliphatic or aromatic group containing 1–12 carbon atoms, or a halogen atom, or where R_1 and R_2, together with the carbon atoms to which they are bound, form a ring system with at least one polymerizable C=C bond.

4,684,707

LOW COLOR, HIGH SOFTENING POINT AROMATIC RESIN AND METHOD FOR ITS PRODUCTION

Morris L. Evans, Baton Rouge, La., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Feb. 10, 1986, Ser. No. 827,579
Int. Cl.[4] C08F *236/04, 240/00*
U.S. Cl. 526—290 **2 Claims**

1. A predominantly aromatic resin having a softening point range of 90° to 115° C., a color Gardner of less than 4 and a cloud point less than 120° C. and a glass transition temperature of about 38° C. to 60° C. wherein said aromatic petroleum resin comprises 35 to 65 weight percent aromatic and non-aromatic unsaturated carbons as measured by C_{13} NMR; and 35 to 65 weight percent saturated carbons with 1 to 15 weight percent of the hydrogens bonded to non-aromatic unsaturated carbons as measured by proton NMR and 50 to 80 weight percent of the hydrogens bonded to saturated carbons and 15 to 35 weight percent of the hydrogens bonded to aromatic carbons.

4,684,708

CATIONIC GRAFTED STARCH COPOLYMERS

Gary L. Deets, St. Peters, and William G. Tamalis, Maryland Heights, both of Mo., assignors to Akzo N.V., Netherlands

Filed Mar. 11, 1985, Ser. No. 710,191
Int. Cl.[4] C08F *31/00, 8/30*
U.S. Cl. 527—312 **7 Claims**

1. A water soluble, cationic, grafted starch copolymer useful as a dry strength additive in paper making, said copolymer comprising starch, nonionic vinyl monomer and a cationic vinyl monomer wherein:

(a) said starch is present in amounts of from about 10% to about 90% of the copolymer, and at least about 5% of the starch is cationic starch;

(b) said nonionic vinyl monomer is selected from the group consisting of styrene, acrylamides, acrylonitriles, conjugated dienes, and mixtures thereof, and is present in amount of from about 90% to about 10% of the copolymer; and

(c) said cationic vinyl monomer is present in amounts from about 5% to about 80% of the copolymer.

4,684,709

ORGANOPOLYSILOXANE COMPOUNDS COMPRISING EPOXY-TERMINATED POLYOXYALKYLENE RADICALS

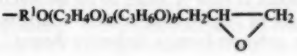
Isao Ona; Masaru Ozaki, and Tadashi Fujii, all of Chiba, Japan, assignors to Toray Silicone Co., Ltd., Tokyo, Japan

Filed Feb. 25, 1986, Ser. No. 833,939
Claims priority, application Japan, Feb. 28, 1985, 60-40168
Int. Cl.[4] C08G *77/06*
U.S. Cl. 528—15 **6 Claims**

1. An organopolysiloxane compound having the formula

$$AR_2SiO(R_2SiO)_x(RQSiO)_ySiR_2A$$

wherein R is a monovalent hydrocarbon or halogenated hydrocarbon group having from 1 to 10 carbon atoms, A is R or Q, Q is a group with the formula



R^1 is an alkylene group having from 3 to 5 carbon atoms, a has an average value of 0 to 30, b has an average value of 0 to 30, a+b has an average value of 2 to 60, x has an average value of 1 to 500, y has an average value of 0 to 100, and containing at least one Q group in each molecule.

4,684,710

HALF-AMIDE REACTION PRODUCTS OF DIOXALATES AND AMINO GROUP CONTAINING MATERIALS

Karl F. Schimmel, Verona; Thomas A. Ward, Gibsonia, and Jerome A. Seiner, Pittsburgh, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 4, 1986, Ser. No. 892,640
Int. Cl.[4] C08B *77/04*
U.S. Cl. 528—26 **9 Claims**

1. An ungelled composition comprising the half-amide reaction product of a diester of oxalic acid and a material containing one or more primary and/or secondary amino groups and one or more different functional groups.

4,684,711

PROCESS FOR PRODUCING A HYDROCARBON RESIN

Yasushi Sakai; Koji Tanaka; Michio Saito, and Akio Kiyohara, all of Yokkaichi, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shin-nanyo, Japan

Filed Feb. 12, 1986, Ser. No. 828,689
Claims priority, application Japan, Mar. 6, 1985, 60-42864
Int. Cl.[4] C08G *65/38*
U.S. Cl. 528—86 9 Claims

1. A process for producing a liquid hydrocarbon resin which comprises polymerizing, by means of a Friedel-Crafts catalyst, a mixture of (1) a residual polymerized fraction obtained by polymerizing a fraction of a boiling point range of from 140° to 280° C. obtained from the decomposition of a petroleum, said fraction containing aromatic hydrocarbons having 9 carbon atoms, and recovering the resulting residual polymerized fraction, and (2) phenol and/or a phenol derivative.

4,684,712

PROCESS FOR PRODUCING WHOLLY AROMATIC POLYESTERS

Ryuzo Ueno, Nishinomiya; Kazuyuki Sakota, Kobe, and Yasunori Nakamura, Nishinimiya, all of Japan, assignors to Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo, Osaka, Japan

Continuation-in-part of Ser. No. 656,004, Oct. 1, 1984, abandoned, which is a continuation of Ser. No. 526,343, Aug. 24, 1983, abandoned. This application Jun. 6, 1986, Ser. No. 871,314
Claims priority, application Japan, Sep. 2, 1982, 57-151711
Int. Cl.[4] C08G *63/02*
U.S. Cl. 528—190 6 Claims

1. A process for producing an aromatic polyester, which comprises polycondensing an aromatic dicarboxylic acid selected from the group consisting of terephthalic acid, naphthalene-1,4-carboxylic acid, naphthalene-2,6-dicarboxylic acid, 4,4'-ethylenedioxydibenzoic acid, 4,4'-thiobisbenzoic acid, and the aromatic polyester-forming derivatives thereof; with an aromatic diol selected from the group consisting of 4,4'-biphenol, 2,6-naphthalene diol, hydroquinone, bisphenol A, 1,1'-thio-4,4'-biphenol, and the aromatic polyester-forming derivatives thereof; and with an aromatic hydroxycarboxylic acid other than 2-hydroxynaphthalene-6-carboxylic acid or the aromatic polyester-forming derivative thereof and with not more than about 18 mole %, based on the amount of the entire raw materials, of 2-hydroxynaphthalene-6-carboxylic acid or an aromatic polyester-forming derivative thereof.

4,684,713

HYDROCARBON TERMINATED POLYAMIDE RESIN AND PROCESS FOR PRODUCING THE SAME

Katsuhisa Kohyama; Masaaki Miyamoto; Hidemi Nakanishi, all of Kitakyushu, and Norimichi Koga, Mizumaki, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Jan. 2, 1986, Ser. No. 815,506
Claims priority, application Japan, Jan. 14, 1985, 60-4557
Int. Cl.[4] C08G *69/14, 69/26*
U.S. Cl. 528—315 9 Claims

1. A polyamide resin having at least one hydrocarbon group or 6 to 22 carbon atoms as the end group of said polyamide and showing a relative viscosity measured in 98% sulfuric acid at a concentration of 1% by weight and at 25° C. in the range of 2.5 to 6, the number of said hydrocarbon groups being 40 to 100% of the total number of end groups of said polyamide.

4,684,714

METHOD FOR MAKING POLYIMIDE OLIGOMERS

Hyman R. Lubowitz, Rolling Hills Estates, Calif., and Clyde H. Sheppard, Bellevue, Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 536,350, Sep. 27, 1983, abandoned, which is a continuation-in-part of Ser. No. 519,394, Aug. 1, 1983, abandoned. This application Sep. 30, 1985, Ser. No. 781,865
Int. Cl.[4] C08G *69/26*
U.S. Cl. 528—353 18 Claims

1. A method of making polyimide oligomers, comprising the steps of:

(a) dissolving a diamine in a suitable solvent;

(b) chilling the diamine solution;

(c) mixing together an unsaturated monoanhydride and a dianhydride to form a premix;

(d) in an inert atmosphere, adding the premix to the diamine solution while continuing to chill the diamine solution; and

(e) removing the cooling source after the addition of the premix to the diamine solution is completed.

4,684,715

EXTRACTION OF RUBBER AND/OR RESIN FROM RUBBER CONTAINING PLANTS WITH A MONOPHASE SOLVENT MIXTURE

Edward L. Kay, Akron, and Richard Gutierrez, Canal Fulton, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 607,493, May 7, 1984, abandoned. This application Jun. 17, 1985, Ser. No. 745,764
Int. Cl.[4] C08C *4/00*
U.S. Cl. 528—493 10 Claims

1. A process for extracting rubber and resin from rubber containing plants comprising the steps of:

adding a monophase solvent to particles of the rubber containing plant, said monophase solvent comprising at least one hydrocarbon solvent, and at least one organic polar solvent, the amount of said hydrocarbon solvent ranging from about 90 to about 55 percent by weight and the amount of said organic polar solvent ranging from about 10 to about 45 percent by weight, said hydrocarbon solvent being selected from the group consisting of an alkane having from 5 to 9 carbon atoms, a cycloalkane having from 5 to 10 carbon atoms, an aromatic or an alkyl substituted aromatic compound having from 6 to 12 carbon atoms, and combinations thereof, and said polar solvent being selected from the group consisting of an alcohol having from 1 to 8 carbon atoms, an ester having from 3 to 8 carbon atoms, a ketone having from 3 to 8 carbon atoms, an ether having from 2 to 8 carbon atoms, and combinations thereof, and simultaneously extracting the rubber and the resin from said plant particles in a relatively short period of time.

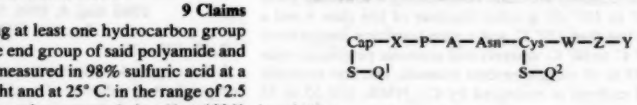
4,684,716

POLYPEPTIDE INTERMEDIATES

Nelson C. Yim, Ambler, Pa., assignor to SmithKline Beckman Corporation, Philadelphia, Pa.

Division of Ser. No. 681,461, Dec. 14, 1984, Pat. No. 4,597,901. This application Apr. 16, 1986, Ser. No. 852,696
Int. Cl.[4] C07K *7/16*
U.S. Cl. 530—328 3 Claims

1. A polypeptide compound of the formula:



in which:

Cap is β-mercapto-β,β-cycloalkylenepropionic acid;

X is TRP or, when P is TRP, X is D-Phe, D-Phe(4'-Alk), D-Tyr, L-Tyr, D-Tyr(Alk) or L-Tyr(Alk);
P is Phe, Phe(4'-Alk) or, when X is other than TRP, P is TRP;
A is Val, Ile, Abu, Ala, Gly, Lys, Cha, Nle, Phe, Leu, Chg or Nva;
W is D-Pro or L-Pro;
Z is D-Arg, L-Arg, HArg, D-Lys or L-Lys
Q^1 and Q^2 are each hydrogen;
Y is NH_2, NHAlk, OH, Gly, Gly(NH_2) or Gly(NHAlk); Alk is a lower alkyl of 1-4 carbons; and TRP is D-Trp, Trp, D-Ing, Ing, or N-formyl derivatives thereof.

4,684,717

PREPARATION OF AZO COMPOUNDS HAVING CARBOXYL AND CYANO GROUPS

Hidetomo Ashitaka, Ichihara; Kazuya Jinda, Kisarazu, and Yoshiyuki Miwa, Ichihara, all of Japan, assignors to UBE Industries, Ltd., Japan

Filed Nov. 29, 1984, Ser. No. 676,264

Claims priority, application Japan, Dec. 8, 1983, 58-230640; Dec. 13, 1983, 58-233669; Apr. 20, 1984, 59-78385; Apr. 20, 1984, 59-78386; Apr. 20, 1984, 59-78387; Jun. 8, 1984, 59-116547

Int. Cl.[4] C07C *10/26, 107/02;* **C08F** *4/04;* **C08G** *63/68*

U.S. Cl. 534—586 **21 Claims**

1. A process for the preparation of a diazocyano acid, which comprises reacting a keto-acid with sodium cyanide and a hydrazine of reacting a sodium salt of a keto-acid with hydrogen cyanide and a hydrazine, in the presence of water in an amount of not more than 200 parts by weight of water per 100 parts by weight of the keto-acid or its sodium salt to form a concentrated aqueous solution of a hydrazo compound, adding acetone or acetone in water to the concentrated aqueous solution to form an acetone-water solution of the hydrazo compound so that a volume ratio of 80/20 to 65/35 of acetone to water in a reaction mixture containing a dyazocyano acid and resulting from the next oxidation step is attained, adding an oxidant to the solution to oxidize the hydrazo compound and form the diazocyano acid, forming at least two transparent liquid layers by adding acetone or acetone and water to the obtained reaction mixture during or after oxidation if necessary, and further adding sodium chloride to the reaction mixture if necessary, and separating the upper layer of the acetone-water solution containing the diazocyano acid and recovering the diazocyano acid from the separated acetone-water solution.

4,684,718

PROCESS FOR THE PREPARATION OF DIAZOCYANO ACIDS BY REACTING KETO-ACIDS WITH CYANOGEN COMPOUNDS

Hidetomo Ashitaka, Ichihara; Kazuya Jinda, Kisarazu, and Yoshiyuki Miwa, Ichihara, all of Japan, assignors to UBE Industries, Ltd., Japan

Filed Nov. 29, 1984, Ser. No. 676,265

Claims priority, application Japan, Dec. 8, 1983, 58-230640; Dec. 13, 1983, 58-233669; Apr. 20, 1984, 59-078385; Apr. 20, 1984, 59-078386; Apr. 20, 1984, 59-078387; Jun. 8, 1984, 59-116547

Int. Cl.[4] C07C *101/26, 107/02;* **C08F** *4/04;* **C08G** *63/68*

U.S. Cl. 534—586 **22 Claims**

1. A process for the preparation of diazocyano acid, which comprises reacting a keto-acid with sodium cyanide and a hydrazine or reacting a sodium salt of a keto-acid with hydrogen cyanide and a hydrazine in the presence of water in an amount of not more than 200 parts by weight of water per 100 parts by weight of the keto-acid or its sodium salt to form a concentrated aqueous solution of a hydrazo compound, adding acetone or acetone and water to the concentrated aqueous solution to form a solution of the hydrazo compound so that a volume ratio of 85/15 to 98/2 of acetone to water in a reaction mixture containing a diazocyano acid and resulting from the next oxidation step is attained, adding chlorine gas to the solution to oxidize the hydrazo compound and form the diazocyano acid, and separating the supernatant acetone-water solution containing the diazocyano acid and recovering the diazocyano acid from the acetone-water solution.

4,684,719

α,α-TREHALOSE FATTY ACID DIESTER DERIVATIVE

Yoshihiro Nishikawa; Kimihiro Kanemitsu, both of Kanazawa; Tatsuhiko Katori, Ibaragi; Akihiro Shibata, Narashino, and Kenichi Kukita, Kashiwa, all of Japan, assignors to SS Pharmaceutical Co., Ltd., Tokyo, Japan

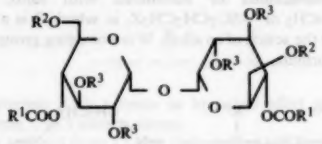
Filed May 15, 1985, Ser. No. 734,198

Claims priority, application Japan, Jun. 5, 1984, 59-115204

Int. Cl.[4] C07H *13/02*

U.S. Cl. 536—119 **1 Claim**

1. An α,α-trehalose fatty acid diester derivative represented by the formula (I):



(I)

wherein R^1 means an alkyl group having 1–21 carbons atoms, R^2 denotes a hydrogen atom or carbobenzoxy group, and R^3 stands for a hydrogen atom or benzyl group.

4,684,720

PROCESS FOR THE PREPARATION OF A MIXTURE OF α-D-GLUCOPYRANOSIDO-1,6-MANNITOL AND α-D-GLUCOPYRANOSIDO-1,6-SORBITOL FROM α-D-GLUCOPYRANOSIDO-1,6-FRUCTOSE

Gerhard Darsow, and Wolfgang Biedermann, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 18, 1985, Ser. No. 692,600

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1984, 3403973

Int. Cl.[4] C07H *15/08*

U.S. Cl. 536—124 **8 Claims**

1. In the preparation of a mixture of α-D-glucopyranosido-1,6-mannitol and α-D-glucopyranoside-1,6-sorbitol by catalytically hydrogenating α-D-glucopyranosido-1,6-fructose in aqueous solution with hydrogen under increased pressure and at elevated temperature, the improvements which comprises effecting the hydrogenation continuously over a fixed bed of support-free shaped pieces of elements of sub-group 8 of the periodic table, which serve as the hydrogenation catalyst.

4,684,721

FIBER-REACTIVE PHTHALOCYANINE COMPOUND HAVING BOTH VINYLSULFONE TYPE AND DIHALOGENOTRIAZINYL GROUPS

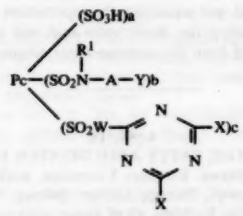
Tetsuya Miyamoto, Takatsuki; Takashi Omura, Ashiya; Naoki Harada, Suita, and Akira Takeshita, Oita, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Mar. 3, 1986, Ser. No. 835,788

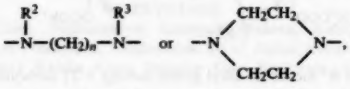
Int. Cl.[4] C09B *47/04*

U.S. Cl. 540—126 **5 Claims**

1. A phthalocyanine compound represented by the following formula in a free acid form,



wherein Pc is a metal-containing or metal-free phthalocyanine residue, R^1 is hydrogen or a lower alkyl unsubstituted or substituted with halogen, hydroxyl, cyano, alkoxy, carboxy, carbamoyl, alkoxycarbonyl, alkylcarbonyloxy, sulfo, or sulfamoyl, A is phenylene unsubstituted or substituted with one or two members selected from the group consisting of methyl, ethyl, methoxy, ethoxy, chlorine, bromine and sulfo, or naphthylene unsubstituted or substituted with sulfo, Y is $-SO_2CH{=}CH_2$ or $-SO_2CH_2CH_2Z$, in which Z is a group splittable by the action of an alkali, W is a bridging group of the following formula,



in which R^2 and R^3 are independently hydrogen, methyl or ethyl, and n is an integer of from 2 through 6, X is a halogen, a is 0 or a number of not more than 2 ($0 \leqq a \leqq 2$), and b and c are independently a number of 1 through 3 ($1 \leqq b \leqq 3$, $1 \leqq c \leqq 3$), provided that the total of a, b and c is not more than 4 ($a+b+c \leqq 4$).

4,684,722

MONOSULFACTAMS

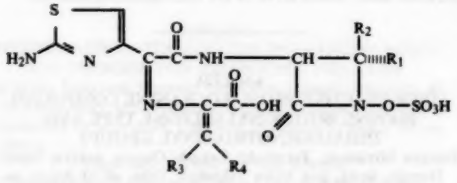
Joseph E. Sundeen, Yardley, Pa., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jan. 6, 1986, Ser. No. 816,475

Int. Cl.[4] C07D *417/12, 417/14, 277/38;* A61K *31/425*

U.S. Cl. 540—203 **12 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein

R_1 and R_2 are the same or different and each is hydrogen or alkyl, or R_1 and R_2 together are $-(CH_2)_n-$ wherein n is 2, 3, 4, 5 or 6; and

R_3 and R_4 are the same or different and each is hydrogen or alkyl of 1 to 3 carbon atoms.

4,684,723

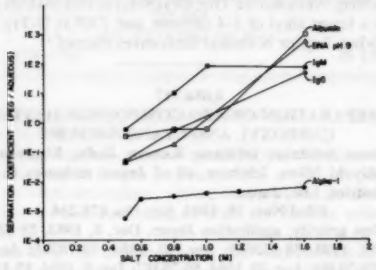
METHOD OF SEPARATING PROTEINS FROM AQUEOUS SOLUTIONS

George B. Dove, Hercules, and Gautam Mitra, Kensington, both of Calif., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Sep. 11, 1985, Ser. No. 774,677

Int. Cl.[4] C07G *7/00*

U.S. Cl. 530—351 **6 Claims**



1. A method for separating alpha-1-proteninase inhibitor from a group consisting of therapeutically active proteins and nucleic acids in an aqueous system containing (1) at least one of said member of the group consisting of therapeutically active proteins and nucleic acids, and (2) at least one polymer component that is at least partly water-miscible and has the ability to create two liquid phases in said aqueous system selected from the group consisting of polyalkylene glycols, a polymer having a cellulosic backbone and a polymer having a polyacrylamide backbone, which method comprises adding to said aqueous system an amount of at least one water soluble, inorganic salt sufiicient to separate said aqueous system into two liquid phases, the improvement comprising separating alpha-1-proteinase inhibitor from said mixture by salt partition techniques to form a salt phase and a polyalkylene glycol phase by the addition to said mixture of from about 0.5 M to about 1.6 M of at least one water soluble, inorganic salt at a temperature of from about (−)5° C. to about 5° C. and at a pH of from about 5 to about 9 to obtain an aqueous solution containing alpha-1-proteinase inhibitor in said salt phase free of unwanted proteins and substantially free of polymer.

4,684,724

4-CYANO-2-AZETIDINONES AND PRODUCTION THEREOF

Michihiko Ochiai, Osaka; Shoji Kishimoto, Hyogo, and Taisuke Matsuo, deceased, late of Osaka, Japan (by Michiko Matsuo, legal representative), assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

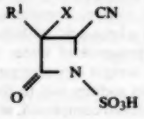
Division of Ser. No. 451,323, Dec. 20, 1982, Pat. No. 4,560,508. This application Oct. 23, 1985, Ser. No. 791,998

Claims priority, application Japan, Dec. 25, 1981, 56-212718; PCT Int'l Appl., Apr. 27, 1982, PCT/JP82/00141

Int. Cl.[4] C07D *205/08, 401/12, 403/12;* A61K *31/395*

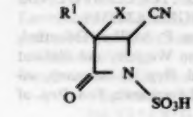
U.S. Cl. 540—355 **10 Claims**

1. A 4-cyano-2-azetidinone compound of the formula



wherein R^1 is amino or acylated amino wherein the acyl group is derived from a carboxylic acid and X is a hydrogen atom or a methoxy group, or a salt or an ester thereof.

2. A 4-cyano-2-azetidinone compound of the formula



wherein R^1 is a protected amino group, and X is a hydrogen atom or a methoxy group, or a salt or an ester thereof.

4,684,725

NON-HYGROSCOPIC ADINAZOLAM METHANESULFONATE SALT AND PROCESS THEREFOR

Burris D. Tiffany, Portage; Steve Nichols, Vicksburg; Paul A. Meulman, Kalamazoo, all of Mich.; Thomas A. Hylton, Eugene, Oreg., and Michael F. Lipton, Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 576,042, Feb. 1, 1984, abandoned, and Ser. No. 562,685, Dec. 19, 1983, abandoned. This application Jul. 22, 1985, Ser. No. 757,594

Int. Cl.[4] C07D *487/04;* A61K *31/55*

U.S. Cl. 540—565 **8 Claims**

1. A process for preparing crystalline essentially non-hygroscopic adinazolam methanesulfonate which comprises

mixing adinazolam free base into a liquid mixture of a C_1 to C_2-alkanol and a C_4 to C_6-alkyl acetate, or mixtures thereof,

adding methanesulfonic acid diluted in a low boiling liquid to the above adinazolam mixture in an amount of methanesulfonic acid not to exceed the molar amount of adinazolam in the resulting mixture,

heating the resulting mixture to a temperature sufficient to dissolve at least some of the adinazolam in the mixture, to promote formation of the adinazolam methanesulfonate salt, and for a time sufficient to remove essentially all of the C_1 to C_2-alkanol and any water in the mixture,

cooling the resulting mixture to precipitate and crystallize the adinazolam methanesulfonate from the mixture, and

separating the resulting adinazolam methanesulfonate salt from the liquid phase.

4,684,726

REACTIVE STABILIZING COMPOUNDS CONTAINING A STERICALLY HINDERED AMINO GROUP AND A HYDROLYZABLE SILYL FUNCTION

Alberto Greco, Dresano; Carlo Busetto, S. Donato Milanese; Luigi Cassar, S. Donato Milanese, and Carlo Neri, S. Donato Milanese, all of Italy, assignors to Enichem Sintesi, S.p.A., Palermo, Italy

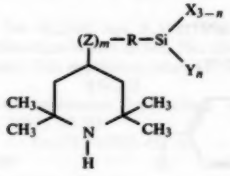
Filed May 13, 1985, Ser. No. 733,526

Claims priority, application Italy, May 21, 1984, 21023 A/84

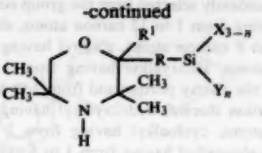
Int. Cl.[4] C07F *7/10*

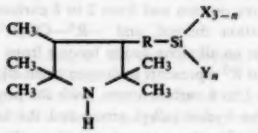
U.S. Cl. 544—69 **13 Claims**

1. Reactive stabilizing compounds having one of the following formulas:



-continued



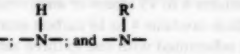


wherein;

m is 0 or 1;

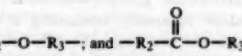
R′ is selected from hydrogen and methyl;

Z is selected from



wherein R_1 is a linear or branched alkyl group having from 1 to 5 carbon atoms;

R is selected from a linear or branched alkylene group having from 1 to 10 carbon atoms;



wherein R_2 and R_3 are each linear or branched alkylene groups having from 2 to 10 carbon atoms;

X is selected from a linear or branched alkyl group having from 1 to 5 carbon atoms;

Y is selected from hydrogen, halogen, C_1–C_4 acyloxy, C_1–C_4 alkyloxy, amino, aminooxy and silyloxy; and

n is an integer selected from one, two and three.

4,684,727

ZWITTERIONIC 1,8-NAPHTHYRIDINE AND PYRAZINO[2,3-B]PYRIDINE CONTAINING COMPOUNDS USEFUL AS ANTI-ALLERGIC, ANTI-INFLAMMATORY AND CYCLOPROTECTIVE AGENTS

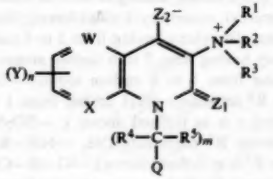
David J. Blythin, North Caldwell, and Ho-Jane Shue, Pine Brook, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Jul. 29, 1985, Ser. No. 760,196

Int. Cl.[4] A61K *31/44;* C07D *471/04*

U.S. Cl. 544—127 **11 Claims**

1. A compound having the structural formula I



(I)

and pharmaceutically acceptable salts thereof, wherein:

X represents —N= and W represents —CH= or —N=;

Z_1 and Z_2 are the same or different and each independently represents —O— or —S—;

R^1, R^2, R^3, R^4 and R^5 are the same or different and each may

be independently selected from the group consisting of H, alkyl having from 1 to 12 carbon atoms, alkenyl having from 3 to 8 carbon atoms, alkynyl having from 3 to 8 carbon atoms, alkoxyalkyl having from 1 to 6 carbon atoms in the alkoxy portion and from 2 to 6 atoms in the alkyl portion thereof, hydroxyalkyl having from 2 to 8 carbon atoms, cycloalkyl having from 3 to 8 carbon atoms, acyloxyalkyl having from 1 to 6 carbon atoms in the acyloxy portion and from 2 to 8 carbon atoms in teh alkyl portion thereof, and $—R^6—CO_2R^0$ wherein R^6 represents an alkylene group having from 1 to 6 carbon atoms and R^0 represents hydrogen or an alkyl group having from 1 to 6 carbon atoms, with the provisos that the OH of the hydroxyalkyl group and the acyloxy of the acyloxyalkyl group are not joined to the same carbon atom as another heteroatom and that, when R^1, R^2 and/or R^3 are alkenyl or alkynyl, there is at least one carbon-carbon single bond between the nitrogen atom and the carbon-carbon double or triple bond;

in addition, one of R^1, R^2 or R^3 can be an aryl group which contains 6 to 15 atoms or an aromatic heterocyclic group which contains 4 to 14 carbon atoms, either of which can be substituted with one to three substituents Y asa defined below;

in further addition, two of R^1, R^2 and R^3 can be joined together to represent an imdazolyl ring or to represent a ring which can contain from 2 to 8 carbon atoms, said ring optionally containing a —O—, —S— and/or $—NR^4—$ heteroatomic group (wherein R^4 is as defined above) and/or optionally containing a carbon-carbon double bond, and said ring optionally being substituted with one to three additional substituents R^7 which substituents may be the same or different and are each independently selected from OH with the proviso that OH is not on a carbon already joined to a hereto atom, —O— acyl having from 1 to 6 atoms; hydroxyalkyl having from 1 to 8 carbon atoms, alkoxyalkyl having from 1 to 6 carbon atoms in each alkyl portion thereof, alkyl having from 1 to 6 carbon atoms, alkenyl having from 3 to 8 carbon atoms, alkynyl having from 3 to 8 carbon atoms, or any two R^7 substituent groups may represent a hydrocarbon ring having from 4 to 8 total carbon atoms;

in still further addition, all three of R^1, R^2 and R^3 can be joined together to represent a polycyclic ring, which polycyclic ring can optionally be substituted by one to three substituents groups R^7 as defined above;

m is an integer of from 0 to 3;

n is an integer of from 0 to 2;

Q represents an aryl or an aromatic heterocyclic group which can optionally be substituted with 1 to 3 substituents Y as defined below;

each Y substituent is independently selected from the group consisting of hydroxy, alkyl having from 1 to 6 carbon atoms, halogen, NO_2, alkoxy having from 1 to 6 carbon atoms, trifluoromethyl, cyano, cycloalkyl having from 3 to 7 carbon atoms, alkenyloxy having from 3 to 6 carbon atoms, alkynyloxy having from 3 to 6 carbon atoms, hydroxyalkyl having from 1 to 6 carbon atoms, $—S(O)_n—R^8$ (wherein R^8 represents alkyl having from 1 to 6 carbon atoms and n is as defined above), $—SO_2NH_2$, $—CO—R^9$ (wherein R^9 represents OH, $—NH—R^8$ or $—O—R^8$, where R^8 is as defined above), $—O—B—COR^9$ (wherein B represents an alkylene group having from 1 to 4 carbon atoms and R^9 is as defined above), $—NH_2$, —NHCHO, $—NH—CO—R^9$ (wherein R^9 is as defined above, with the proviso that it is not hydroxy), $—NH—COCF_3$, $—NH—SO_2R^8$ (wherein R^8 is as defined above), and $—NHSO_2CF_3$.

4,684,728

SOLUBILIZING BIOLOGICALLY ACTIVE COMPOUNDS WITH REACTIVE HYDROGEN ATOMS

Edgar Möhring, Berg.-Gladbach; Hanns P. Müller, Odenthal; Peter Roessler, Berg.-Gladbach; Kuno Wagner, and Helmut Tietz, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 28, 1979, Ser. No. 107,976

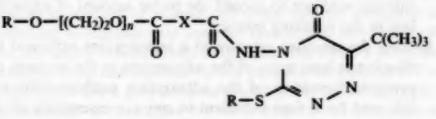
Claims priority, application Fed. Rep. of Germany, Jan. 12, 1979, 2901060; Mar. 16, 1979, 2910356

Int. Cl.[4] C07D *253/00, 251/00, 273/04, 265/00*

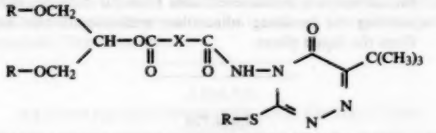
U.S. Cl. 544—182 **12 Claims**

1. A process for improving the solubility in water and or lower aliphatic alcohols of a sparingly soluble biologically active compound which has at least one hydrogen atom active in Zerewitinoff reactions comprising reacting (a) a hydrophilic polyether that contains one OH, NH or NH_2 group and having a water absorption capcity of at least 15%, relative to the weight of the polyether with (b) an organic compound having at least two groups that are reactive towards hydrogen atoms that are active in Zerewitinoff reactions, in the ratio (m − 1):m for the number of the OH, NH or NH_2 equivalents of the polyether (a) to the number of the equivalents of groups in the organic compound (b) that are reactive towards hydrogen atoms that are active in Zerewitinoff reactions and reacting that product with an equivalent amount of (c) the biologically active compound.

4. A compound produced by the process of claims 1, 2, or 3 of the formula



or

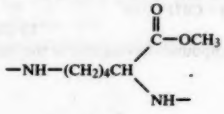


in which

R is alkyl of 1 to 4 carbon atoms,

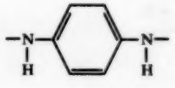
n = 1 to 90, and

X is



$—NH(CH_2)_6NH—$

$—(CH_2)_4—$ or



4,684,729

POLYETHYLENE POLYPIPERAZINE COMPOSITIONS

Lawrence G. Duquette, Maynard, and Philip E. Garrou, Hollis-ton, both of Mass., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 514,080, Jul. 15, 1983, abandoned. This application May 7, 1986, Ser. No. 861,018

Int. Cl.[4] C07D *403/12, 403/13;* C08G *73/06*

U.S. Cl. 544—357 **22 Claims**

1. A process for the preparation of polyethylene polypiperazines comprising contacting piperazines, ethyleneamine-substituted piperazines, or mixtures thereof, wherein such compounds contain a primary or secondary nitrogen and wherein one of the carbon atoms adjacent to the primary or secondary nitrogen has a hydrogen atom bonded thereto, with a catalytic amount of palladium on a support, under conditions whereby the polyethylene polypiperazines are prepared.

4,684,730

PYRAZINE-SULFONYLCARBAMATES AND THIOCARBAMATES

Beat Böhner, Binningen; Werner Föry, Basel; Rolf Schurter, Binningen, all of Switzerland, and Georg Pissiotas, Lörrach, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 496,325, May 19, 1983, Pat. No. 4,612,037. This application Mar. 21, 1986, Ser. No. 842,603

Claims priority, application Switzerland, May 28, 1982, 3314/82

Int. Cl.[4] C07D *241/18*

U.S. Cl. 544—408 **8 Claims**

1. a compound of the formula

$$Q—SO_2—NH—CZ—OR$$

wherein

Q is a pyrazine group, said group being unsubstituted or substituted by halogen, pseudohalogen, nitro, C_1–C_6alkyl, C_1–C_6haloalkyl, C_1–C_6alkoxy, C_1–C_6alkylthio, C_1–C_6haloalkoxy, C_1–C_6haloalkylthio, amino, C_1–C_6alkylamino, di-C_1–C_6-alkylamino, C_1–C_6alkylcarbonylamino, C_1–C_6alkylcarbonyl, C_1–C_6alkoxycarbonyl, C_1–C_6alkylthiocarbonyl, carbamoyl, C_1–C_6alkylaminocarbonyl, C_1–C_6dialkylaminocarbonyl, C_1–C_6alkylsulfinyl, C_1–C_6alkylsulfonyl, C_2–C_6alkenyloxy, C_2–C_6alkynyloxy, or by phenyl, phenoxy or phenylthio, which are unsubstituted or substituted by halogen, nitro, cyano, C_1–C_6alkyl, C_1–C_6alkoxy, C_1–C_6haloalkyl or C_1–C_6-haloalkoxy, or by benzyl or benzyl substituted by halogen and/or C_1–C_6alkyl,

Z is oxygen or sulfur and

R is C_1–C_4alkyl, phenyl or benzyl.

4,684,731

PHENYL-QUINOLIZIDINES

Rene Imhof, Gipf-Oberfrick, and Emilio Kyburz, Reinach, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

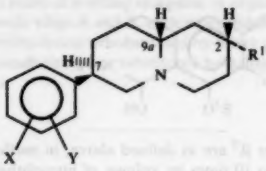
Division of Ser. No. 252,540, Apr. 9, 1981, Pat. No. 4,391,978, which is a continuation-in-part of Ser. No. 186,936, Sep. 12, 1980, abandoned. This application Mar. 11, 1983, Ser. No. 474,233

Claims priority, application Switzerland, Apr. 11, 1980, 2784/80; Feb. 3, 1981, 701/81

Int. Cl.[4] C07D *455/02*

U.S. Cl. 546—138 **21 Claims**

1. A compound of the formula



I

wherein X is hydrogen, fluorine, chlorine, lower-alkoxy, lower-alkyl or trifluoromethyl;

Y is hydrogen, fluorine, chlorine, lower-alkoxy or lower-alkyl; and R^1 is acylamino selected from the group consisting of lower-alkanoylamino, (C_4-C_7)-cycloalkylcarbonylamino, 2-furancarbonylamino 2-thiophenecarbonylamino or 2-oxo-1-pyrrolidinocarbonylamino which residues can be substituted at the nitrogen atom by lower-alkyl or phenyl optionally substituted by halogen, lower-alkyl or lower-alkoxy or a racemate or enantiomer thereof, or a pharmaceutically acceptable acid addition salt thereof.

4,684,732

PROCESS FOR PREPARATION OF PHTHALIDE DERIVATIVES

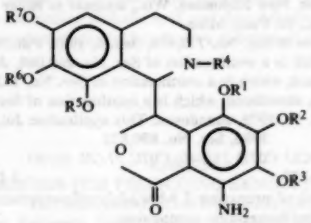
Masao Taniguchi, Machida; Yoshiharu Morita; Shuzo Hayakawa, both of Yokohama, and Osamu Kawashima, Kitakyushu, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Mar. 5, 1985, Ser. No. 708,811

Int. Cl.[4] C07D *405/04, 405/14*

U.S. Cl. 546—144 **7 Claims**

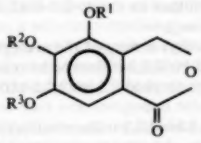
1. A process for preparing phthalide derivatives represented by the general formula (IV):



(IV)

wherein R^1 to R^7 are independently selected from lower alkyl groups and either R^5 and R^6 or R^6 and R^7 may otherwise together form a methylene group, comprising:

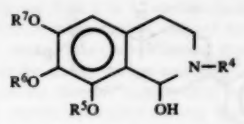
(i) reacting in a solent a phthalide represented by the general formula (V):



(V)

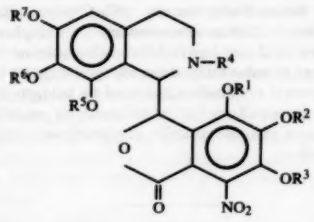
wherein R^1 to R^3 are as defined above, with copper nitrate or zinc nitrate to obtain a nitrophthalide;

(ii) reaching the nitrophthalide with isoquinoline represented by the general formula (II):



(II)

wherein R^4 to R^7 are as defined above, in methanol in an amount of 1.5 to 10 times by volume of nitrophthalide and a reaction temperature of 50° to 80° C. for a reaction period of 8 to 36 hours to produce a phthalide isoquinoline represented by the general formula (III):



(III)

wherein R^1 to R^7 are as defined above; and

(iii) reducing the phthalideisoquinoline in a solvent at a reaction temperature of −20° to 120° C. and reaction period of 0.5 to 24 hours.

4,684,733

PROCESS FOR THE PREPARATION OF INTERMEDIATES OF DERIVATIVES OF PYRROLIDINE AND PIPERIDINE

Charles M. Leir, New Richmond, Wis., assignor to Riker Laboratories, Inc., St. Paul, Minn.

Continuation of Ser. No. 772,474, Sep. 4, 1985, Pat. No. 4,617,396, which is a continuation of Ser. No. 269,068, Jun. 2, 1981, abandoned, which is a continuation of Ser. No. 162,312, Jun. 23, 1980, abandoned, which is a continuation of Ser. No. 21,332, Mar. 19, 1979, abandoned. This application Jul. 28, 1986, Ser. No. 890,821

Int. Cl.⁴ C07D *213/40*; C07C *51/29, 51/60*

U.S. Cl. 546—337 **3 Claims**

3. A method of preparing 2,5-bis(2,2,2-trifluoroethoxy)-N-(2-pyridylmethyl)benzamide comprising:

(a) contacting 1,4-dibromobenzene with an alkali metal 2,2,2-trifluoroethoxide in the presence of cuprous or cupric ion in a strongly polar solvent comprising 2,2,2-trifluoroethanol to provide 1,4-bis(2,2,2-trifluoroethoxy)-benzene;

(b) treating said 1,4-bis(2,2,2-trifluoroethoxy)benzene, in the presence of a Lewis acid catalyst, with an acetylation agent under conditions to create 2,5-bis(2,2,2-trifluoroethoxy)acetophenone);

(c) replacing the methyl moiety of the acetophenone function of said 2,5-bis)2,2,2-trifluoroethoxy)acetophenone using hypochlorite to yield 2,5-bis(2,2,2-trifluoroethoxy)-benzoic acid;

(d) treating said 2,5-bis(2,2,2-trifluoroethoxy)benzoic acid with an inorganic chloride to provide 2,5-bis(2,2,2-trifluoroethoxy)benzoic acid chloride; and

(e) contacting said 2,5-bis(2,2,2trifluoroethoxy)benzoic acid chloride with 2-aminomethylpyridine to provide 2,5-bis(2,2,2-trifluoroethoxy)-N-(2-pyridylmethyl)benzamide.

4,684,734

METHOD FOR MANUFACTURE OR ORGANIC FLUORINE COMPOUNDS

Osamu Kaieda, Osaka; Masaru Awashima, Suita; Isao Okitaka, and Toshiaki Nakamura, both of Osaka, all of Japan, assignors to Nippon Shokubai KK Co., Ltd., Osaka, Japan

Continuation of Ser. No. 580,849, Feb. 16, 1984, abandoned. This application Sep. 13, 1985, Ser. No. 776,085

Claims priority, application Japan, Feb. 18, 1983, 58-24848; Oct. 31, 1983, 58-202590; Nov. 24, 1983, 58-219473; Nov. 24, 1983, 58-219474

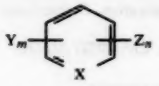
Int. Cl.⁴ C07C *120/00, 121/50*; C07D *213/61, 213/00*

U.S. Cl. 546—345 **17 Claims**

1. A method for the manufacture of an organic fluorine compound represented by the general formula VIII:

(VIII)

wherein V denotes N, CW, or CF where W is Cl, Br, CN or NO_2, p denotes an integer of the value of 0 to 4, and q denotes an integer of the value of 1 to 5, providing that the sum of p and q is an integer of the value of not more than 5, which comprises causing a chloro- or bromo-organic compound represented by the general forumla I:



(I)

wherein X denotes N, —CY or —CZ where Y is Cl or Br and Z is F, CN or NO_2, m denotes an integer of the value of 1 to 5, and n an integer of the value of 0 to 4, providing that the sum of m and n is an integer of the value of not more than 5 to react with at least one fluorinating agent selected from the group consisting of alkali metal fluorides and alkaline earth metal fluorides in benzonitrile as a solvent at temperatures in the range of 190° to 400° C. under at least spontaneously generated pressure whereby at least one of said Y halogens is replaced by F.

4,684,735

PROMOTION OF RANEY NICKEL HYDROGENATION CATALYST

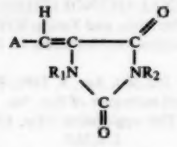
Stanley B. Mirviss, Stamford, Conn., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Jul. 1, 1985, Ser. No. 749,971

Int. Cl.⁴ C07D *233/72*

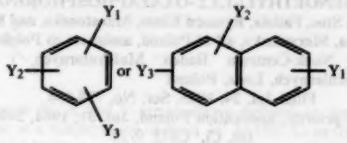
U.S. Cl. 548—308 **10 Claims**

1. A process for the promotion of the nickel catalyzed reduction of unsaturated hydantoin compounds containing at least one exocyclic aliphatic carbon-carbon double bond of the formula:



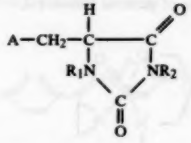
wherein A is X or Y and X is unbranched or branched alkyl or alkenyl, cycloalkyl, cycloalkenyl, alkylthio, hydroxyalkyl, aralkyl, mono or dialkylalkylaminoalkyl, acylaminoalkyl, mercaptoalkyl, cycloalkyl having a $—CH_2—$ group replaced by

—O—, —S—, or —NH— cycloalkenyl having a —CH= replaced by —O—, —S—, or —N=; and Y is



wherein Y_1, Y_2 and Y_3 are the same or different and are hydrogen, alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, halogen, hydroxy, nitro, cyano, amino, alkylaminoalkyl, dialkylaminoalkyl, alkoxy, alkylthio, acyloxy, mercaptoalkyl, alkaryl, aralkyl, acylaminoalkyl, cycloalkyl having a $—CH_2—$ group replaced by —O—, —S—, or —NH— cycloalkenyl having a —CH= replaced by —N= or where two of the members, Y_1, Y_2, and Y_3 are joined together to form an alkylene group having at least one $—CH_2—$ group replaced by —O—, —S—, or —NH— or an alkenylene group having at least one —CH= group replaced by —N=; and

R_1 and R_2 are the same or different and are hydrogen, alkyl, aryl, acyl or amino which consists essentially of using a tertiary alkyl amine as a promoting agent, the reduced compound having the formula



wherein A, R1, and R2 are as defined hereinbefore.

4,684,736

BISIMIDAZOLIUM SALTS

Rosemarie Töpfl, Dornach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

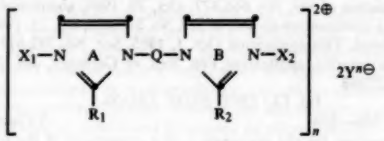
Filed Nov. 4, 1985, Ser. No. 794,936

Claims priority, application Switzerland, Jan. 25, 1985, 351/85

Int. Cl.⁴ C07D *233/61, 233/72*

U.S. Cl. 548—309 **16 Claims**

1. A bisimidiazolium salt of the formula

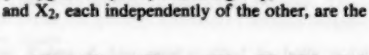


(1)

wherein

Q is a divanet aliphatic hydrocarbon radical of 4 to 12 carbon atoms, which is unsubstituted or substituted by hydroxyl groups and which may be interrupted in the chain by oxygen or by a hydrantoin group,

X_1 and X_2, each independently of the other, are the



Hal is halogen,

R_1 and R_2, each independently of the other, are hydrogen, phenyl or an aliphatic radical having 1 to 23 carbon atoms,

n is 1 or 2, and

$Y^{\ominus}$ is an anoin of a strong inorganic or organic acid, and the imidazole rings A and B, each independently of the other, are unsubstituted or substituted by lower alkyl which is in turn unsubstituted or substituted by halogen, hydroxyl or cyano.

4,684,737

PROCESS FOR PRODUCING SUBSTITUTED PHTHALIC ACID COMPOUNDS

Hiroshi Horino, Yokohama; Michiro Ohnaka, Kamakura; Atsushi Hayashi, Yokohama, and Yoshiko Ikeno, Kawasaki, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Aug. 17, 1984, Ser. No. 641,729

Claims priority, application Japan, Aug. 19, 1983, 58-151158

Int. Cl.⁴ C07D *307/89*; C07C *51/305, 67/28*

U.S. Cl. 549—240 **13 Claims**

1. A process for producing a substituted phthalic acid, which comprises heating a substituted terahydrophthalic acid compound having a substituent selected from the group consisting of lower alkyl, lower alkoxy, acyloxy, cyano, phenyl and halogen in at least one of the 3-, 4-, 5-and 6-positions at a temperature of 180°–350° C. in the presence of one to ten gram-atoms per mole of said compound of sulfur to dehydrogenate it and, subsequently, heat-treating the dehydrogenation product at a temperature of 50° to 200° C. in the presence of 0.3 to 20 parts by weight of water per part by weight by the dehydrogenation product.

12. A process for producing a substituted phthalic anhydride which comprises heating a substituted tetrahydrophthalic compound having a substituent selected from the group consisting of lower alkyl, lower alkoxy, acyloxy, cyano, phenyl and halogen in at least one of the 3-, 4-, 5- and 6-positions at a temperature of 180°–350° C. in the presence of 1 to 10 gram-atoms per mole of said compound of sulfur to dehydrogenate it, heat-treating the dehydrogenation product at a temperature of 50° to 200° C. in the presence of 0.3 to 20 parts by weight of water per part by weight of dehydrogenation product to produce a substituted phthalic acid, and then dehydrocyclizing the substituted phthalic acid to form a substituted phthalic anhydride.

4,684,738

PROCESS FOR PRODUCING BENZOPHENONE TETRACARBOXYLIC DIANHYDRIDE

Shuetsu Fujiwara; Naoki Andoh, and Kenji Hosotani, all of Yokohama, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Apr. 22, 1986, Ser. No. 854,473

Claims priority, application Japan, Apr. 24, 1985, 60-86477

Int. Cl.⁴ C07D *307/89*

U.S. Cl. 549—242 **15 Claims**

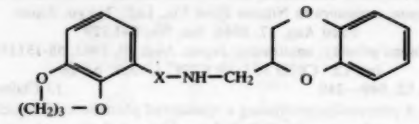
1. A process for producing benzophenone tetracarboxylic dianhydride, which comprises adding benzophenone tetracarboxylic acid to a solvent comprising, as the main constituent, an organic compound having a boiling point of more than 100° C. and being inert to benzophenone tetracarboxylic acid and benzophenone tetracarboxylic anhydrides, said organic compound being at least one compound selected from the group consisting of alkylbenzenes, naphthalene compounds, polyaryl compounds, aliphatic hydrocarbons, and ether compounds, heating the resulting mixture at a temperature of from 180°–250° C., cooling said mixture to thereby deposit crystals of benzophenone tetracarboxylic dianhydride, and separating said crystals of benzophenone tetracarboxylic dianhydride.

4,684,739
ALKYLENEDIOXYBENZENE DERIVATIVES AND ACID ADDITION SALTS THEREOF

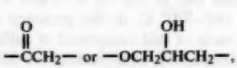
Ryoji Kikumoto, Machida; Harukazu Fukami, Yokohama; Kenichiro Nakao, and Mamoru Sugano, both of Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Dec. 1, 1981, Ser. No. 326,417
Claims priority, application Japan, Dec. 15, 1980, 55-176910; Dec. 25, 1980, 55-184290; Aug. 7, 1981, 56-123817; Aug. 11, 1981, 56-125813
Int. Cl.[4] C07D *319/20, 321/10*
U.S. Cl. 549—350 12 Claims

1. An alkylenedioxybenzene compound of the formula:



wherein X is $-O(CH_2)_3-$, $-O(CH_2)_4-$, $-NH(CH_2)_3-$, $-NH(OH_2)_4-$, $-(CH_2)_4-$,



or an acid addition salt thereof.

4,684,740
PRODUCTION OF 2,6-BIS (4-HYDROXY-3,5-DIMETHOXYPHENYL-3,7-DIOXABICYCLO (3.3.0) OCTANE

Takayoshi Higuchi, Kyoto; Mitsuhiko Tanahashi, Uji, and Motoo Mastukura, Tokyo, all of Japan, assignors to Jujo Paper Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1986, Ser. No. 840,757
Claims priority, application Japan, Mar. 22, 1985, 60-58079
Int. Cl.[4] C07D *493/04*
U.S. Cl. 549—464 13 Claims

1. A process for the production of 2,6-bis(4-hydroxy-3,5-dimethoxyphenyl)-3,7-dioxabicyclo(3.3.0) octane, which comprises heating plants containing lignin with syringyl unit under pressure in an autoclave in a hydrous condition, quickly discharging the heated, pressurized plants into a receiver at atmospheric pressure, subjecting the discharged plants to extraction with an organic solvent or an alkaline solution and recovering the 2,6-bis(4-hydroxy-3,5-dimethoxyphenyl)-3,7-dioxabicyclo(3.3.0) octane from the resulting extract.

4,684,741
SELECTIVE PRODUCTION OF DIMETHYLDICHLOROSILANE

Christian Prud'Homme, Lyons, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Filed Feb. 24, 1986, Ser. No. 832,080
Claims priority, application France, Feb. 22, 1985, 85 02550
Int. Cl.[4] C07F *7/08*
U.S. Cl. 556—472 17 Claims

1. A process for the preparation of dimethyldichlorosilane, which comprises reacting methyl chloride with a solid contact mass comprising silicon and a catalytically effective amount of copper or a copper compound, said cooper catalyst comprising (i) from about 10 to 1,000 ppm of tin, antimony, or admixture thereof, or of a tin or antimony compound, or admixture thereof, (ii) from about 0.05 to 2% by weight of at least one of the metallic additives beryllium, calcium and magnesium, or compound thereof, and (iii) from about 0.01 to 3% by weight of zinc or a zinc compound.

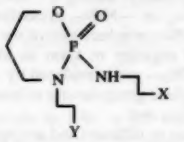
4,684,742
PROCESS FOR THE PRODUCTION OF 2-(2-HALOGENOETHYLAMINO)-2-OXO-3-(2-HALOGENOETHYL)-1.3.2.-OXAZAPHOSPHORINANES

Wojciech Stec, Falista; Ryszard Kinas, Maratonska, and Konrad Misiura, Marysinska, all of Poland, assignors to Polska Akademia Nauk-Centrum Baden Molekularnych I Makromolekularnych, Lodz, Poland

Filed Jul. 24, 1985, Ser. No. 758,484
Claims priority, application Poland, Jul. 31, 1984, 249007
Int. Cl.[4] C07F *9/21*
U.S. Cl. 558—81 9 Claims

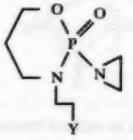
1. A process for the preparation of racemic or enantiomeric forms of 2-(2-halogenoethylamino)-2-oxo-3-(2-halogenoethyl)-1.3.2.-oxazaphosphorinanes of general formula 1,

form. 1



wherein X and Y are the same or different and represent halogen atoms, which comprises reacting an aqueous solution containing 3-6% hydrogen halide with racemic or enantiomeric ethyleneimide of general formula 2,

form. 2



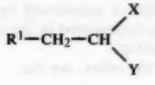
wherein Y is as defined above, dissolved in water or in chloroform.

4,684,743
PREPARATION OF ALPHA-SUBSTITUTED β-DICARBONYL, β-CYANO-CARBONYL AND β-DICYANO COMPOUNDS

Walter Gramlich, Edingen-Neckarhausen; Klaus Halbritter, Mannheim, and Gerd Heilen, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 666,477, Oct. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 515,880, Jul. 21, 1983, abandoned. This application Oct. 1, 1985, Ser. No. 782,615
Claims priority, application Fed. Rep. of Germany, Jul. 22, 1982, 3227388
Int. Cl.[4] C07C *69/38, 120/00*
U.S. Cl. 558—374 7 Claims

1. A process for the preparation of a compound of the formula I



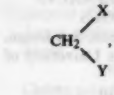
I

where R^1 is alkyl of 1-20 carbons and X and Y denote $-COOR^2$, or $-CN$ with R^2 being a C_1-C_{10} alkyl, which process comprises:

reacting an aldehyde II

R^1-CHO II

with a compound III



III

wherein R', X and Y are as above defined, in the liquid phase at a temperature of from 25° to 180° C. in the presence of hydrogen, a noble metal hydrogenation catalyst and a condensation catalyst consisting essentially of an oxide or phosphate of magnesium, aluminum, titanium, zinc or a rare earth metal, said reaction taking place in the essential absence of a homogeneous catalyst component.

4,684,744

STILBENE DERIVATIVES

Klaus Artz, Muttenz; Hans R. Meyer, Binningen, both of Switzerland; Dieter Reinehr, Kandern, Fed. Rep. of Germany, and Kurt Weber, Basel, Switzerland, assignors to Ciga-Geiby Corporation, Ardsley, N.Y.

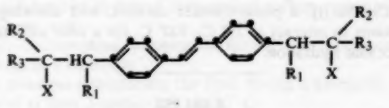
Filed Mar. 21, 1985, Ser. No. 714,250

Claims priority, application Switzerland, Mar. 27, 1984, 1526/84

Int. Cl.⁴ C07C *121/66, 69/616*

U.S. Cl. 558—388 **5 Claims**

1. A stilbene derivative of the formula



wherein

X is chlorine or bromine,

R_1 is hydrogen, carboxyl, cyano, C_1–C_6-alkyl or a non-chromophorically esterified carboxyl group selected from the group consisting of carboxylic acid alkyl esters, where the alkyl moiety is unsubstituted or substituted by hydroxyl, alkoxy, alkoxyalkoxy, hydroxyalkoxy, or alkoxycarbonyl, and carboxylic acid alkenyl ester groups, where the alkenyl moiety is unsubstituted or substituted by alkoxy, hydroxyalkoxy or alkoxycarbonyl, and

R_2 and R_3 independently of one another are each hydrogen, unsubstituted or non-chromophorically substituted C_1–C_6-alkyl or C_3–C_4-alkenyl, said non-chromophoric substituents being selected from the group consisting of alkoxy, hydroxyalkoxy or alkoxycarbonyl, or a non-chromophoric substituent of the 2nd order selected from the group consisting of cyano, carbonamido, carboxyl, carboxylic acid alkyl ester groups, wherein the alkyl moiety is unsubstituted or substituted by hydroxyl, alkoxy, alkoxyalkoxy or hydroxyalkoxy, and alkyl-, phenyl- and benzylsulfonyl groups, wherein the alkyl moiety is unsubstituted or substituted by alkoxy or alkoxyalkoxy.

4,684,745

PROCESS FOR PRODUCING α-L-ASPARTYL-L-PHENYLALANINE METHYL ESTER FOR ITS HYDROCHLORIDE

Tadashi Takemoto, Kawasaki, and Yasuo Ariyoshi, Yokohama, both of Japan, assignors to Ajinomoto Company Incorporated, Tokyo, Japan

Filed Apr. 13, 1983, Ser. No. 484,506

Claims priority, application Japan, Apr. 22, 1982, 57-67687

Int. Cl.⁴ C07C *101/32*

U.S. Cl. 560—41 **6 Claims**

1. A process for selectively producing α-L-aspartyl-L-phenylalanine methyl ester or its hydrochloride, which comprises:

contacting N-formyl-α-L-aspartyl-L-phenylalanine methyl ester with a mixture of 7 to 12N aqueous hydrochloric acid and 5 to 60% by volume of methanol, based on the volume of the aqueous hydrochloric acid, at a temperature of between 0° and 40° C. for a time of from 1 to 5 days, whereby the amino-protecting formyl group is removed and α-L-aspartyl-L-phenylalanine methyl ester hydrochloride crystalizes; and

isolating said hydrochloride from said mixture.

4,684,746

ACTIVATED ANIONIC POLYMERIZATION OF LACTAMS

Rolf-Volker Meyer; Friedrich Fahnler; Rolf Dhein, and Dietrich Michael, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 1, 1985, Ser. No. 750,000

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1984, 3425318

Int. Cl.⁴ C07C *127/24*

U.S. Cl. 564—38 **5 Claims**

1. Activator mixture comprising biuret-group-containing polyisocyanates based on non-aromatic diisocyanates, mixed with liquid N-alkyl-lactams, as activators for the activated anionic polymerization of lactams.

4,684,747

N,N'-BIS(SULFONYL)HYDRAZINES HAVING ANTINEOPLASTIC ACTIVITY

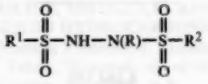
Alan C. Sartorelli, Woodbridge, and Krishnamurthy Shyam, Hamden, both of Conn., assignors to Yale University, New Haven, Conn.

Continuation-in-part of Ser. No. 683,852, Dec. 20, 1984, abandoned. This application Dec. 18, 1985, Ser. No. 810,644

Int. Cl.⁴ C07C *143/825*

U.S. Cl. 564—081 **17 Claims**

1. A compound of the formula:



where R is selected from the group consisting of methyl and 2-chloroethyl, and R^1 and R^2, which may be the same or different, are each an alkyl moiety, an aromatic hydrocarbon moiety, or a ring substituted aromatic hydrocarbon moiety.

4,684,748

ANTICONVULSANT AGENTS

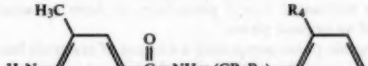
David W. Robertson, Greenwood, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Jul. 26, 1985, Ser. No. 759,219

Int. Cl.⁴ A61K *31/165;* **C07C** *103/82, 103/76*

U.S. Cl. 514—619 **9 Claims**

1. A compound of the Formula



I

wherein

R_1, R_2, and R_3 are each independently hydrogen or methyl;

R_4 and R_5 are each methyl; and

n is 0; and pharmaceutically acceptable acid addition salts thereof.

4. A pharmaceutical formulation which comprises a com-

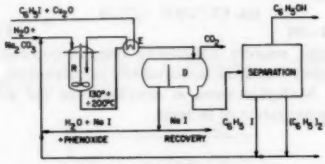
pound of claim 1 in association with a pharmaceutically acceptable carrier or diluent.

4,684,749

PROCESS FOR THE SYNTHESIS OF PHENOL

Giuseppe Paparatto, Milan, Italy, assignor to Montedipe S.p.A., Milan, Italy

Filed May 27, 1986, Ser. No. 866,706
Claims priority, application Italy, May 31, 1985, 20991 A/85
Int. Cl.[4] C07C *37/01, 37/02*
U.S. Cl. 568—797 **13 Claims**



1. A catalytic process for the synthesis of phenol by hydrolysis of iodobenzene in the liquid phase, characterized in that the hydrolysis is carried out at 120°–260° C., in the presence of a basic acidity acceptor selected from the group consisting of the alkali metal hydroxides, carbonates and bicarbonates, and in the presence of a copper-containing catalyst selected from the group consisting of cuprous oxide, cuprous chloride, cuprous iodide, and mixtures thereof.

4,684,750

PROCESS FOR THE PRODUCTION OF 2-ETHYL-HEXANOL

Gunther Kessen, Oberhausen; Boy Cornils, Hofheim; Wilhelm Gick, Duisburg; Ernst Wiebus; Joseph Hibbel, both of Oberhausen; Hanswilhelm Bach, Duisburg, and Wolfgang Zgorzelski, Oberhausen-Buschhausen, all of Fed. Rep. of Germany, assignors to Ruhrchemie Aktiengesellschaft, Fed. Rep. of Germany

Filed Aug. 26, 1986, Ser. No. 900,389
Claims priority, application Fed. Rep. of Germany, Aug. 29, 1985, 3530839
Int. Cl.[4] C07C *29/16, 31/125*
U.S. Cl. 568—883 **10 Claims**

1. A process for the production of 2-ethyl-hexanol comprising reacting propene with carbon monoxide and hydrogen, in the presence of an aqueous catalyst containing rhodium and at least one sulfonated triaryl phosphine, to form an aqueous phase and an organic phase,

said organic phase comprising a mixture of materials having boiling points lower than that of n-butanal and substances having boiling points equal to or higher than that of n-butanal, said materials including i-butanal,

separating said material from said substances, subjecting said substances to aldol condensation, in the presence of aqueous alkali, to form 2-ethyl hexenal,

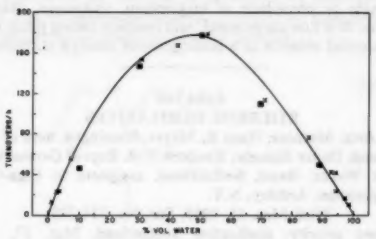
first hydrogenating said 2-ethyl-hexenal in a gas phase in the presence of a first hydrogenation catalyst and thereafter hydrogenating said 2-ethyl-hexenal in a liquid phase to form 2-ethyl-hexanol in the presence of a second hydrogenation catalyst.

4,684,751

CATALYTIC COMPOSITIONS FOR PREPARING AMIDES AND PRIMARY ALCOHOLS

William C. Trogler, Encinitas, and Craig M. Jensen, San Diego, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Feb. 13, 1986, Ser. No. 829,410
Int. Cl.[4] C07C *29/04, 31/125, 31/20*
U.S. Cl. 568—898 **7 Claims**



1. A method of hydrating olefinic linkages in a compound via anti-Markownikoff addition comprising admixing in an oxygen-free solution the following reactants: water, a compound exhibiting an olefinic linkage, hydroxide ions, $PtHCl(PMe_3)_2$, a phase-transfer catalyst, and allowing said reactants to interact at 25° C.–100° C. for a time sufficient to effect said hydration.

4,684,752

DI-ORTHO-SUBSTITUTED DI-META-HALOGENATED PARA-HALOMETHYLPHENOLS

Abel Mendoza, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 30, 1986, Ser. No. 858,473
Int. Cl.[4] C07C *39/24*
U.S. Cl. 568—779 **25 Claims**

1. A process to prepare a 4-HALOmethyl-3, 5-dihalo-2, 6-disubstitutedphenol comprising contacting a 4-methyl(substituted)phenol with a HALOgenating agnet, in an aprotic organic diluent, under conditions whereby the 4-HALOmethyl-3, 5-dihalo-2, 6-disubstitutedphenol is prepared.

4,684,753

PROCESS FOR PREPARING 1,3,6,8-TETRABROMOPYRENE

Siegfried Schiessler, Bad Soden am Taunus, and Ernst Spietschka, Idstein, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 12, 1986, Ser. No. 907,400
Claims priority, application Fed. Rep. of Germany, Sep. 14, 1985, 3532882
Int. Cl.[4] C07C *17/02*
U.S. Cl. 570—206 **7 Claims**

1. A process for preparing 1,3,6,8-tetrabromopyrene by brominating pyrene in aqueous suspension with simultaneous reoxidation of the resulting hydrogen bromide to bromine by means of an oxidizing agent, which comprises reacting pyrene, in a highly concentrated aqueous suspension having a pyrene-water weight ratio of 1:1.2 to 2 with bromine at temperatures of 40° to 65° C. with simultaneous reoxidation of the reSulting hydrogen bromide to bromine using an oxidizing agent, completing the bromination by heating the reaction mixture to temperatures of 70° to 130° C., reducing excess bromine with a reducing agent to hydrogen bromide and subjecting the 1,3,6,8-tetrabromopyrene formed, preferably without intermediate isolation, to an alkaline aftertreatment at temperatures of 40° to 100° C. within the pH range 8.5 to 12.

4,684,754

WORKING FLUID FOR TRACTION DRIVE

Toshiyuki Tsubouchi, and Hitoshi Hata, both of Sodegaura, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Nov. 14, 1986, Ser. No. 931,431
Claims priority, application Japan, Nov. 29, 1985, 60-268961; Dec. 23, 1985, 60-287882
Int. Cl.[4] C07C 13/605; C10M 1/02
U.S. Cl. 585—21 10 Claims

1. A working fluid for traction drive which comprises:

(A) a first compound selected from the class consisting of

(A-1) bis(decahydronaphthalene) compounds having two decahydronaphthalene rings in a molecule directly bonded to each other,

(A-2) alkane compounds having two decahydronaphthalene rings in a molecule bonded to one and the same carbon atom of the alkane,

(A-3) alkane compounds having two decahydronaphthalene rings in a molecule bonded to two carbon atoms of the alkane adjacent to each other,

(A-4) alkane compounds having a decahydronaphthalene ring and a cyclohexane ring in a molecule bonded to one and the same carbon atom of the alkane, and

(A-5) cyclohexyl decahydronaphthalene compounds; and

(B) a second compound selected from the class consisting of

(B-1) alkane compounds having a main chain of two or three carbon atoms, to which at least two methyl groups are bonded, and having two cyclohexane rings in a molecule each bonded to one of the terminal carbon atoms of the alkane, and

(B-2) cyclopentane compounds having two cyclohexane rings in a molecule;

as the principal constituents, the fluid having a kinematic viscosity of at least 3 centistokes at 100° C.

4,684,755

CATALYZED PROCESS

David Parris, and Steven P. Tonner, both of Melbourne, Australia, assignors to ICI Australia Limited, Victoria, Australia

Filed Sep. 17, 1986, Ser. No. 908,207
Claims priority, application Australia, Sep. 27, 1985, PH2661
Int. Cl.[4] C07C 5/02, 5/327
U.S. Cl. 585—257 14 Claims

1. A process for the transhydrogenation of a blend of hydrocarbons comprising at least one alkene which acts as a hydrogen acceptor, and at least one alkane, wherein the blend is contacted with a transhydrogenation catalyst under the following conditions:

(a) the pressure of the blend at the catalyst is from atmospheric pressure to four atmospheres (gauge);

(b) the hydrogen acceptor is present in the blend to the extent of from 5–30% of the volume thereof;

(c) the temperature of the catalyst is from 400° C. to 600° C.; and

(d) during the process, the temperature of the catalyst is raised at the rate of from 1 to 15 deg. C. per hour.

4,684,756

PROCESS FOR UPGRADING WAX FROM FISCHER-TROPSCH SYNTHESIS

W. Rodman Derr, Jr., Vincentown; William E. Garwood, Haddonfield; James C. Kuo, Cherry Hill; Tiberiu M. Leib, Voorhees; Donald M. Nace, Woodbury, and Samuel A. Tabak, Wenonah, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 1, 1986, Ser. No. 858,620
Int. Cl.[4] C07C 1/20
U.S. Cl. 585—330 5 Claims

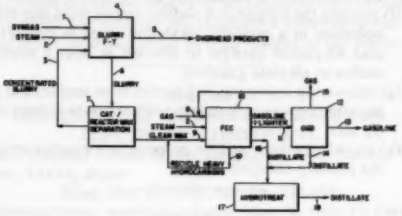
1. A process for converting synthesis gas to liquid hydrocarbons comprising the steps of:

(a) charging said synthesis gas to a Fischer-Tropsch synthesis conversion zone containing a catalyst providing CO reducing characteristiccs to produce a waxy hydrocarbon liquid;

(b) separating hydrocarbon wax from said waxy liquid;

(c) catalytically cracking said wax in a fluidized bed of acid crystalline zeolite at cracking temperature under process conditions requiring a supply of heat to effect cracking, thereby producing olefinic liquid hydrocarbon crackate in the gasoline and distillate boiling range along with olefinic light gas;

(d) recovering distillate range hydrocarbons from the liquid crackate;



(e) further converting the olefinic gasoline range hydrocarbon crackate and olefinic light gas under oligomerization conditions in contact with a shape selective medium pore acid oligomerization catalyst to upgrade at least a portion of said olefinic crackate and olefinic light gas to distillate range hydrocarbon product and producing by-product light fuel gas;

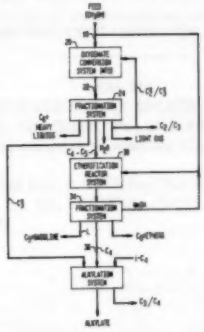
(f) separating said light fuel gas from step (e) and passing said light fuel gas to cracking step (c) to supply heat thereto.

4,684,757

PROCESS FOR CONVERTING METHANOL TO ALKYL ETHERS, GASOLINE, DISTILLATE AND ALKYLATE LIQUID HYDROCARBONS

Amos A. Avidan, Mantua; Frederick J. Krambeck, Cherry Hill, and Samuel A. Tabak, Wenonah, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 18, 1986, Ser. No. 886,996
Int. Cl.[4] C07C 1/20, 2/00
U.S. Cl. 585—331 7 Claims



1. A process for converting oxygenate feedstock comprising methanol to liquid hydrocarbons comprising the steps of

(a) contacting the feedstock with zeolite catalyst in a primary catalyst stage at elevated temperature and moderate pressure to convert feedstock to hydrocarbons comprising C_2–C_5 olefins and C_6+ liquid hydrocarbons;

(b) cooling and separating the primary stage effluent to recover a liquid C_6+ hydrocarbon stream and a light

hydrocarbon stream rich in C_2–C_5 olefins including propylene and C_4–C_5 isoalkenes;

(c) compressing at least a portion of the olefinic light hydrocarbon stream to condense a liquid olefinic hydrocarbon stream rich in C_4–C_5 isoalkenes and recovering a gaseous stream rich in ethene and propene;

(d) reacting the isoalkenes with methanol in a secondary stage etherification zone by contacting the isoalkenes and methanol with an acid etherification catalyst to produce C_5–C_6 methyl isoalkylethers;

(e) fractionating the secondary stage effluent to obtain a liquid ether and C_5^+ hydrocarbon stream and an olefinic C_4 stream rich in unreacted butenes and isobutane;

(f) reacting the butene-rich olefinic stream from step (e) with isobutane in a catalytic alkylation stage in contact with acid alkylation catalyst to convert at least a portion of olefins to alkylate gasoline;

(g) recovering a propene-rich stream from step (c) and reacting said propene-rich stream with excess isobutane in step (f); and

(h) recycling ethene and/or propene in a gaseous stream to the primary catalytic stage.

4,684,758

PRODUCTION OF 2,5-DIMETHYL-2,4-HEXADIENE

Yasuhiko Higashio, and Kazuteru Takahashi, both of Ichihara, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Filed Jul. 31, 1986, Ser. No. 891,173

Claims priority, application Japan, Aug. 7, 1985, 60-173815; Dec. 27, 1985, 60-297283; Feb. 3, 1986, 61-21697; Apr. 30, 1986, 61-101324

Int. Cl.⁴ C07C *1/20, 11/12*

U.S. Cl. 585—608 **7 Claims**

1. A method for preparing 2,5-dimethyl-2,4-hexadiene by bringing isobutylene and/or tert.-butyl alcohol into contact with isobutyl aldehyde in a gaseous phase in the presence of a niobic acid catalyst at a temperature of 150°–350° C.

4,684,759

PROCESS FOR RECOVERING ENERGY FROM AN ETHANE-RICH RECYCLE STREAM

Wilfred K. Lam, Arcadia, Calif., assignor to C. F. Braun & Co., Alhambra, Calif.

Filed Aug. 23, 1985, Ser. No. 768,956

Int. Cl.⁴ C07C *4/02*

U.S. Cl. 585—652 **56 Claims**

1. A process for recovering energy from an ethane-rich feed stream flowing to a pyrolysis furnace used for the production of ethylene from said feed stream, comprising the steps of:

reducing the pressure of the ethane-rich stream to below the inlet pressure of the pyrolysis furnace to decrease the temperature of said ethane-rich stream to form a chilled ethane-rich stream;

vaporizing the chilled ethane-rich stream by heat exchange with a process stream to form a vaporized ethane-rich stream and a chilled process stream;

compressing the vaporized ethane-rich stream to form a compressed ethane-rich stream;

passing the compressed ethane-rich stream to the pyrolysis furnace; and

utilizing the chilled process stream to reduce refrigeration energy consumption.

4,684,760

CATALYST COMPOSITIONS USEFUL FOR OLEFIN ISOMERIZATION AND DISPROPORTIONATION

Charles A. Drake, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 24, 1986, Ser. No. 832,547

Int. Cl.⁴ C07C *5/25*

U.S. Cl. 585—670 **14 Claims**

1. A process for the double bond isomerization of an aliphatic olefinic hydrocarbon feed which comprises contacting said feed under isomerization conditions with a catalyst prepared by:

(a) impregnating an alumina support having a surface area of at least 200 m^2/g and a pore volume of at least 0.45 cm^3/g with:

1 up to 20 wt. % of at least one magnesium compound convertible to the oxide, based on the weight of support and calculated as the metal;

0 up to 5 wt. % of at least one alkali metal compound convertible to the oxide, based on the weight of support and calculated as the metal; and

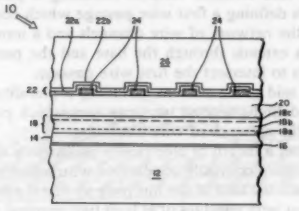
0 up to 5 wt. % of at least one zirconium compound convertible to the oxide, based on the weight of support and calculated as the metal; and thereafter

(b) heating the alumina support impregnated in accordance with step (a) in an oxygen-containing atmosphere under conditions suitable to convert at least a portion of said magnesium, alkali metal, and zirconium compounds to the oxide form.

4,684,761
METHOD FOR MAKING GRADED I-III-VI_2 SEMICONDUCTORS AND SOLAR CELL OBTAINED THEREBY

Walter E. Devaney, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 9, 1986, Ser. No. 850,461
Int. Cl.[4] H01L *31/06, 31/18*
U.S. Cl. 136—258 60 Claims



55. A solar cell having a conversion efficiency of at least about 10.4% AMO, comprising:

(a) a substrate;

(b) a base contact on the substrate;

(c) a polycrystalline, thin film $CuInSe_2$ semiconductor deposited on the contact and including a near-contact region rich in selenium, a p-type bulk region, and a near-junction region defining a p-n type transient homojunction in the semiconductor;

(d) a $(Zn_{0.2}Cd_{0.8})S$ thin film deposited atop the $CuInse_2$ semiconductor to define a heterojunction, the film including sufficient indium doping in the region away from the heterojunction to provide a sheet resistance of the film of between about 20–25 ohm/square;

(e) aluminum grid metalization atop the $(Zn_{0.2}Cd_{0.8})S$ thin film, the metalization being sufficiently thick to eliminate grid resistance losses;

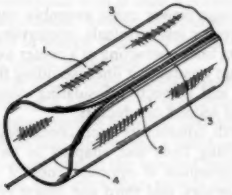
(f) a SiO_x antireflection coating atop the $(Zn_{0.2}Cd_{0.8})S$ thin film and metalization, the SiO_x having an optical index of refraction of about 1.73; and

(g) a MgF_2 antireflection coating atop the SiO_x.

4,684,762
SHIELDING FABRIC

Harry F. Gladfelter, Phoenixville, Pa., assignor to Raychem Corp., Menlo Park, Calif.

Filed May 17, 1985, Ser. No. 735,883
Int. Cl.[4] H01B *7/34, 13/26;* D03D *15/02, 23/00*
U.S. Cl. 174—36 30 Claims



1. A fabric for electrical shielding which comprises a fabric which is woven, braided or warp knitted from a yarn which comprises conductive fibers and non-conductive fibers wherein the conductve fibers comprise fibers of carbon, graphite or conductive polymer or comprise non-conductive fibers which are plated, coated or impregnated with a conductive material and wherein the conductive fibers comprise between 10% and about 80% by weight of the fabric.

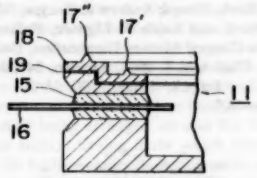
20. An assembly comprising a substrate and a fabric in shielding relationship therewith wherein the fabric is woven, braided or warp knitted from yarns which comprise conductive and non-conductive fibers and non-conductive fibers wherein the conductive fibers comprise fibers of carbon, graphite or conductive polymer or comprise non-conductive fibers which are plated, coated or impregnated with a conductive material and wherein the conductive fibers comprises between about 10% and about 80% by weight of the fabric.

30. A method of electrically shielding a substrate which comprises placing in shielding relationship with the substrate a fabric which is woven, braided or warp knitted from yarns which comprise conductive fibers and non-conductive fibers wherein the conductive fibers comprise fibers of carbon, graphite or conductive polymer or comprise non-conductive fibers which are plated, coated or impregnated with a conductive material and wherein the conductive fibers comprise between about 10% and about 80% by weight of the fabric.

4,684,763
HERMETICALLY SEALABLE PACKAGE FOR ELECTRONIC COMPONENT

Saburo Harada, Tokyo, Japan, assignor to Koto Electric Co., Ltd., Urawa, Japan

Filed May 28, 1985, Ser. No. 738,665
Claims priority, application Japan, May 28, 1984, 59-108156; May 1, 1985, 60-94202
Int. Cl.[4] H05K *5/04*
U.S. Cl. 174—52 FP 5 Claims

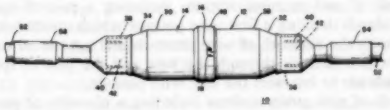


1. A hermetically sealable package for electronic component comprising a metallic base member and a metallic lid member, the metallic base member having lead wires penetrating therethrough wrapped in insulation, wherein the base member or lid member is provided on its periphery with at least two protrusions for welding which are formed by etching, said protrusions having a top, respectively, and being provided in such a manner that the tops of the protrusions are different in height from each other.

4,684,764
HIGH VOLTAGE CABLE SPLICE PROTECTOR

Glenn J. Luzzi, Mt. Bethel, Pa., and Andrew A. Kominiak, Flanders, N.J., assignors to Amerace Corporation, Hackettstown, N.J.

Filed Dec. 9, 1985, Ser. No. 806,591
Int. Cl.[4] H02G *15/115*
U.S. Cl. 174—91 4 Claims



1. A cable splice enclosure comprising; rigid, hollow receptacle housing means having a first end and a second end; rigid, hollow plug housing means having a first end and a second end; the outside and inside diameters of said receptacle housing means and said plug housing means adjacent said first ends are

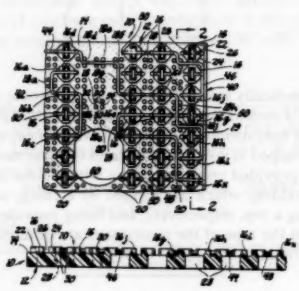
of a first predetermined value and define, respectively, receptacle housing means body portion and plug housing means body portion; and the outside and inside diameters of said receptacle housing means and said plug housing means adjacent said second ends are of a second predetermined value less than said first predetermined value and define, respectively, receptacle housing means end portion and plug housing means end portion; the lengths of said receptacle housing means end portion and said plug housing means end portion being short compared to the lengths of said receptacle housing means body portion and said plug housing means body portion; each of said receptacle housing means end portion and said plug housing means end portion have at least two longitudinal slots extending inwardly from said second ends towards said first ends of said respective receptacle housing means and plug housing means for substantially the entire lengths of said receptacle housing means end portion and plug housing means end portion whereby said second predetermined values may be decreased; bayonet locking means joining the first end of said receptacle housing means to said first end of said plug housing means upon relative rotation therebetween; and end sealing means, one adjacent each of said second ends of said receptacle housing means and said plug housing means for sealing the electrical cables entering through said second ends of said receptacle housing means and said plug housing means into said enclosure.

4,684,765

BUS ASSEMBLY AND METHOD OF MAKING SAME

Lawrence R. Beck, Girard; Andrew J. Kocjan, Niles; Richard A. Natoli, Girard, and Louis J. Liguore, Poland, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 1, 1986, Ser. No. 846,880
Int. Cl.[4] H05K *1/00, 13/00*
U.S. Cl. 174—68.5 **14 Claims**



1. A bus assembly comprising:

a bus insulation plate comprising a base having a plurality of terminal stations and a plurality of guide stations,

said terminal stations and said guide stations being separated from each other so as to provide a network of wire channels which separate each station from every other station so that an electrically conductive wire may pass between each station and every other station,

each of said terminal stations including a pair of spaced islands defining a first wire passage which communicates with the network of wire channels and a terminal cavity which extends through the base and the pair of spaced islands to intersect the first wire passage,

each of said guide stations including a plurality of projections defining a second wire passage which communicates with the network of wire channels, and

electrical busing means for conveying electrical current comprising an electrically conductive wire which passes through the first wire passage of at least two terminal stations and a portion of the network of wire channels.

10. A method of manufacturing a bus assembly comprising a bus plate and a bus means for conveying electrical current comprising at least one electrically conductive wire, comprising the steps of

providing a bus plate having a base which includes a plurality of terminal stations and a plurality of guide stations which are separated from each other so as to provide a network of wire channels which separate each station from every other station so that a wire may pass between each station and every other station,

each of said terminal stations including a pair of spaced islands defining a first wire passage which communicates with the network of wire channels and a terminal cavity which extends through the base and the pair of spaced islands to intersect the first wire passage,

each of said guide stations including a plurality of projections defining second wire passages which communicate with the network of wire channels,

paying out a length of electrically conductive wire and,

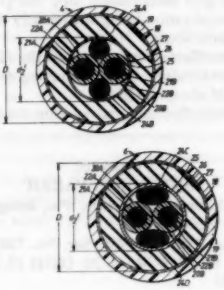
planting the electrically conductive wire which is being paid out onto the base of the bus plate so that it passes through the first wire passages of at least two terminal stations and a portion of the network of wire channels to provide a bus means for terminals disposed in the two terminal stations, respectively.

4,684,766

HIGH VOLTAGE CABLE ASSEMBLY HAVING REDUCED STRAY CAPACITANCE

Shigeru Tanaka, and Isamu Takagi, both of Ohtawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 20, 1985, Ser. No. 778,002
Claims priority, application Japan, Sep. 25, 1984, 59-200185
Int. Cl.[4] H01B *7/34*
U.S. Cl. 174—115 **7 Claims**



1. A high voltage power cable assembly capable of being connected to three or less terminals, comprising:

two conducting lines contacting at a center axis of said cable assembly, said conducting lines including first and second conductors and respective insulating conduits covering said first and second conductors;

third and fourth conductors each contacting with both of said conducting lines and adapted to be connected in parallel to terminals at opposite ends of said third and fourth conductors, said third and fourth conductors having diameters which are less than the diameters of said two conducting lines;

a semi-conductive layer surrounding said two conducting lines and said third and fourth conductors for reducing non-uniformities of electrical fields in said cable assembly;

an insulating layer surrounding said semiconductive layer;

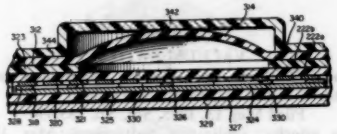
a shielding layer surrounding said insulating layer, said shielding layer including electrical conductive material; and

a non-electrically conductive sheath surrounding said shielding layer.

4,684,767
TACTILE AFFIRMATIVE RESPONSE MEMBRANE SWITCH

Robert F. Phalen, 1612 W. North Ave., Chicago, Ill. 60622

Continuation-in-part of Ser. No. 739,544, May 30, 1985, Pat. No. 4,602,135. This application Jul. 7, 1986, Ser. No. 882,944
The portion of the term of this patent subsequent to Jul. 22, 2003, has been disclaimed.
Int. Cl.[4] H01H *13/70*
U.S. Cl. 200—5 A 15 Claims



1. An improved tactile affirmative response membrane switch comprising:

a top sheet formed from a nonconductive material, with a portion of said top sheet designated thereon for manual pushing to operate the switch, said portion having an upwardly disposed dome shape, manually operable between two positions and having an upwardly disposed first position when the switch is not operating and is in the "off" position and to affirmatively snap into a downwardly disposed second position when the switch is operated to the "on" position, with said dome portion automatically returning affirmatively and snapping to the first position upon manual release thereof, thereby to provide an affirmative and detectible tactile response thereto;

a pair of electronic switch circuit leads disposed in the same plane in noncontacting mutually relative close proximity, said pair of electronic switch circuit leads each comprising a plurality of intertwined but non-contacting elongated bars, said bars having a designated width;

supporting means for said electronic switch circuit leads;

spacer means disposed between said top sheet and said supporting means, and having an opening therein at the location of said dome shaped portion of said top sheet;

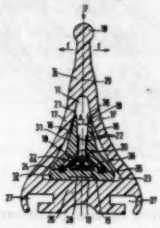
a substantially planar circuit completing means of a size and shape to correspond with at least a portion of said pair of switch circuit leads, formed from conductive material, and disposed in spaced array and substantially parallel to said switch circuit leads; and

a nonconductive circuit spacer means comprising a grid, said grid comprising a plurality of substantially intersecting lines of a nonconductive material, said substantially intersecting lines of said grid having a width which is substantially narrow relative to the selected width of said elongated bars of said electronic switch circuit leads, said substantially intersecting lines of said grid disposed directly between said pair of electronic circuit leads and said circuit completing means, said circuit spacer means grid having a plurality of apertures therein formed by said substantially intersecting lines of said grid and having a selected grid density sufficient to provide a selected touch pressure during pushing at least a portion of the said circuit completing means appearing through the apertures in said spacer grid into contact with at least a portion of the pair of electronic switch circuit leads to complete the circuit and to operate the switch.

4,684,768
RESILIENT SECTIONAL STRIP FOR MOUNTING TO A CLOSURE EDGE

Karl H. Sackmann, Waldkirch, and Christoph Anselment, Freiburg, both of Fed. Rep. of Germany, assignors to Erwin Sick GmbH Optik-Electronik, Waldkirch, Fed. Rep. of Germany

Filed Feb. 19, 1986, Ser. No. 831,019
Claims priority, application Fed. Rep. of Germany, Mar. 25, 1985, 3510806
Int. Cl.[4] H01H *3/16*
U.S. Cl. 200—61.43 10 Claims



1. A resilient sectional strip for mounting to a closure edge of a closure movable to close an opening, such as a swing door, a sliding door, a roller door or a container cover, the strip comprising a first resilient elongate section extending along a closure edge and having a hollow cavity; a second resilent intermediate section disposed within said hollow cavity and having a flat base portion contacitng a base surface of said first resilient elongate section; a resilient electrical switching strip having first and second metallic contact strips which are electrically isolated from one another and resiliently spaced apart, said switching strip being arranged on said flat base portion, said intermediate section having limbs which extend from its side edges into the hollow cavity and enclose the sides of said switching strip, said first resilient elongate section having a substantially triangular cross-section, with the apex of the triangle directed towards an opening to be closed, slightly inwardly arched side surfaces and a corresponding hollow cavity of substantially triangular cross-section, with the base of the triangle being disposed at the closure edge; said limbs which enclosing sides of said switching strip being arranged at the inside of arched side surfaces of said first resilient elongate section in such a way that on bending of said first resilient elongate section through contact with an obstacle said limbs will be respectively loaded by one of said side surfaces which arches further inwardly; said limbs including at their insides, in the region of the surface of said switching strip which faces said apex, inwardly directed actuating ribs arranged so that in the normal state they do not exert an actuating pressure on said switching and so that an actuating pressure is exerted on said switching strip when one of said arched side surfaces and the associated limb is deflected.

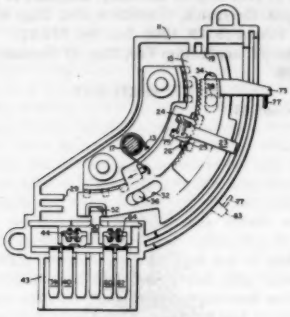
4,684,769
MANUAL CLUTCH SWITCHING SYSTEM

Willi K. Beck, Hingham; Lincoln V. Danielson, Seekonk, and Andrew Strange, Brockton, all of Mass., assignors to Joseph Pollak Corporation, Boston, Mass.

Filed Sep. 8, 1986, Ser. No. 904,488
Int. Cl.[4] H01H *3/14*
U.S. Cl. 200—61.89 8 Claims

1. In a switching system for a vehicle, the combination of a clutch having a movable pedal, a plurality of actuators for opening and closing circuits of operating devices in said vehicle, a housing, means for mounting at least two of said actuators for movement in said housing in response to predetermined movement of said pedal, a spring for urging said at least two actuators in opposite directions in said housing, a radial extension arm connected to each of said two actuators, and a

control arm connected to said pedal, said control arm being in operative contact with one of said radial extension arms during one fraction of said predetermined movement of said pedal and in operative contact with another of said radial extension arms



during another fraction of said predetermined movement of said pedal whereby at least one of said circuits is held open and at least another of said circuits is held closed during said fractions of said predetermined movement.

4,684,770

MICROSWITCH

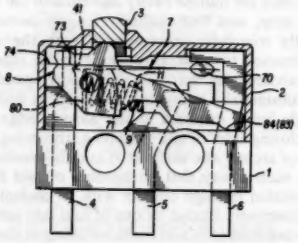
Alain Pitrat, Chateauneuf S/Isere, and Bernard Truchet, Besayes, both of France, assignors to Crouzet, Paris, France

Filed Jul. 18, 1985, Ser. No. 756,255

Claims priority, application France, Jul. 23, 1984, 84 11766

Int. Cl.[4] H01H *5/24*

U.S. Cl. 200—67 R **1 Claim**



1. An electromechanical switching device, comprising:

an insulating base having a support surface and a projection forming a bearing surface;

a compression spring having a thrust axis, a first end of said compression spring engaging with said bearing surface, the thrust axis of said spring being disposed substantially parallel to said support surface of said base;

at least first, second and third coplanar conducting terminals projecting from said base, said first terminal being electrically connected to a movable conducting contactor, said movable contactor being movable to different positions whereby it respectively electrically connects with said second and said third terminals;

an oscillating lever for causing movement of said movable contactor, said lever having at one end a first portion thereof in which said compression spring is mounted, and at another end a second portion defining a pair of feet which slidingly bear on said support surface, said first portion including a surface against which a second end of said compression spring resiliently bears;

said movable contactor comprising a substantially flat conducting blade formed as a single piece and including a rigid axial arm pivotably mounted at a pivot point to said first terminal, and two flexible lateral arms fixed to a free end of said rigid axial arm and interconnected to form a stirrup at ends of said lateral arms which are positioned in a longitudinal direction of said blade beyond said pivot point; and

an actuator mechanism for providing an operating force to said oscillating lever, which in turn supplies said operating force to said stirrup to cause flexure of said lateral arms and movement of said movable contactor.

4,684,771

VACUUM SWITCH

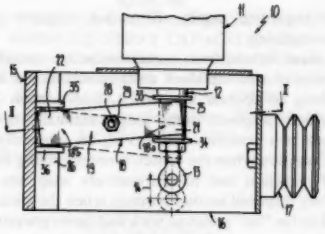
Hans-Rudolf Wüthrich, Oberentfelden, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed May 13, 1985, Ser. No. 733,654

Claims priority, application Switzerland, May 18, 1984, 2443/84

Int. Cl.[4] H01H *33/66*

U.S. Cl. 200—144 B **11 Claims**



1. A vacuum switch, comprising:

a vacuum chamber;

a contact actuation rod sealingly conducted out of said vacuum chamber and reciprocatable through a predetermined length of stroke for commutating electrical terminals of the vacuum switch; a portion of said contact actuation rod defining one terminal;

said portion of said contact actuation rod being electrically connected at said one terminal through at least one pivotally movable conductor to at least one stationary terminal;

said at least one connecting conductor being constructed from an electrically conductive material as a substantially rigid yoke extending substantially transverse to said contact actuation rod;

said yoke having end regions;

said yoke being divided at least at said end regions;

said at least one stationary terminal being provided with at least one protrusion extending substantially toward said contact actuation rod and defining a pivot for said at least one connecting conductor when said contact actuation rod moves through said predetermined length of stroke;

said portion of said contact actuation rod having mutually opposite first locations;

said at least one protrusion having mutually opposite second locations; and

said end regions of said yoke each respectively frictionally engaging one of said portion of said contact actuation rod at said first locations and said at least one stationary terminal at said second locations under elastic action to thereby provide an electrically conductive path between said contact actuation rod and said stationary terminal over the entire length of stroke of said contact actuation rod.

4,684,772

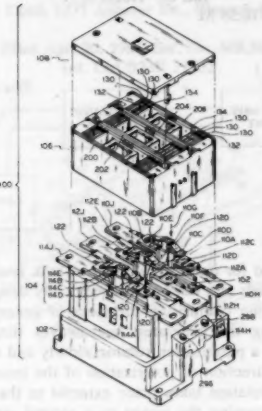
MOUNTING APPARATUS FOR ARC QUENCHING PLATES FOR ELECTRIC CONTACTS

Lewis M. Lehman, Brown Deer, Wis., assignor to Square D Company, Palatine, Ill.

Filed Apr. 9, 1985, Ser. No. 721,984

Int. Cl.[4] H01H *33/08*

U.S. Cl. 200—144 R **21 Claims**



1. An electric switching apparatus comprising:

electric contacts;

arc quenching plates for leading an arc formed by operation of said contacts away from said contacts;

a housing for holding said arc quenching plates, said housing having grooves made into opposing internal walls , said arc quenching plates being insertable from said first side of said housing into said grooves;

a retainer for holding said arc quenching plates in place in said grooves; and,

at least one exhaust channel between said housing and said retainer, said exhaust channel also formed between said retainer and said arc quenching plates, for exhaust of arc gases in a direction substantially parallel to a plane of said retainer and substantially perpendicular to a plane of said arc quenching plates.

4,684,773

GAS-BLAST SWITCH

Lutz Niemeyer, Birr, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Aug. 27, 1985, Ser. No. 769,706

Claims priority, application Switzerland, Oct. 10, 1984, 4864/84

Int. Cl.[4] H01H *33/70*

U.S. Cl. 200—148 R **10 Claims**

1. A gas blast switch, comprising:

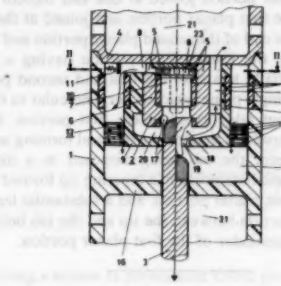
first and second switch pieces, said first switch piece having a hollow space therein, said second switch piece being movable in an axial direction relative to said first switch piece, said second switch piece being received in said hollow space in a switch-on position;

a pressure reservoir encircling said switch pieces, said pressure reservoir being in fluid communication with said hollow space;

an insulating body having a nozzle through which said second switch piece extends when in its switch-on position;

an arc chamber located within said insulating body between said nozzle and said first switch piece, said chamber being in fluid communication with said hollow space in a switch-off position; and

an expansion chamber, said expansion chamber being in fluid communication with said pressure reservoir and said arc chamber in the switch-off position, said nozzle having a narrow opening and including a gas inlet passage communicating said hollow space with said pressure reservoir, and said insulating body and first switch piece coacting to form a gas outlet passage between said narrow opening



and said first switch piece; whereby said second switch piece moves from the switch-on to the switch-off position said expansion chamber is in fluid communication with said hollow space via said gas outlet passage before said pressure reservoir is in fluid communication with said hollow space via said gas inlet passage.

4,684,774

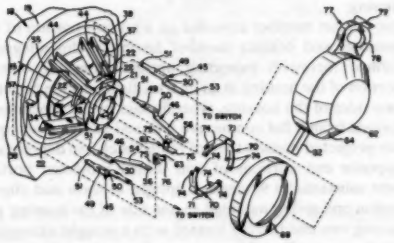
ELECTRICAL CONTACTS FOR A SWITCH

John E. Dibbern, Jr., Street, Md., and Gregory E. Moores, Oxford, Conn., assignors to Black & Decker Inc., Newark, Del.

Continuation of Ser. No. 769,888, Aug. 27, 1985, abandoned, which is a division of Ser. No. 636,161, Jul. 31, 1984, Pat. No. 4,588,189, which is a division of Ser. No. 480,781, Mar. 31, 1983, Pat. No. 4,523,116. This application Oct. 31, 1986, Ser. No. 925,451

Int. Cl.[4] H01H *1/00*

U.S. Cl. 200—275 **3 Claims**



1. A contact for a switch, comprising: an arcuately-shaped member made integrally from relatively thin-gauge metal, the member having respective end portions each of which are joined at one end thereof by a "U"-shaped intermediate portion on opposite sides thereof, each of the end portions defining an arc extending from the "U"-shaped portion to a free end of the end portion; each of the end portions including at least a pair of bent contact-engaging surfaces spaced from each other along the arc thereof and integrally formed therein for engagement with electrical contracts of an electrical device, the "U"-shaped intermediate portion being located substantially radially outwardly of said arc, and the bent contact-engaging

surfaces describing respective arcuate portions located generally radially inwardly of said arc.

3. A contact element formed integrally from relatively thin-gauge sheet metal and comprising an elongated first planar portion located in a first plane and having a first end which is a free end and a second end, an elongated second planar portion located in a second plane spaced from the first plane, an intermediate planar portion joined at one end thereof to the second end of the first planar portion and joined at the other end thereof to one end of the second planar portion and bent at an angle thereto, the intermediate portion having a length which is substantially less than the first and second portions and located in a single plane which is perpendicular to the first plane, a lanced-out tab formed in the first portion, the tab extending transversely of the first portion and forming an acute angle therebetween, the tab being disposed in a direction towards the intermediate portion, a tapering tip formed on the free end of the first planar portion, and a substantial length of the first planar portion between the tip and the tab being narrower than the remainder of the first planar portion.

4,684,775

MINIATURE PUSH BUTTON SWITCH WITH COIL SPRING MOVABLE CONTACT

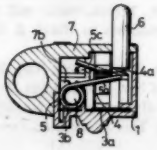
Hiroki Oba, Furukawa, Japan, assignor to Alps Electric Co., Japan

Filed Dec. 26, 1985, Ser. No. 813,580

Claims priority, application Japan, Dec. 25, 1984, 59-200036[U]

Int. Cl.⁴ H01H *1/42*

U.S. Cl. 200—276 **4 Claims**



1. A pushbutton switch comprising:

a housing;

a first contact member mounted on a bottom portion of the housing, said contact member having a clip integrally formed therewith extending upright from the bottom portion of the housing at an intermediate position between two sides of the housing, wherein said contact member is formed from a flat conductive terminal having one coplanar projected portion thereof folded back 180 degrees and opposite end portions of said folded projected portion bent substantially 90 degrees upright to form said clip;

a torsion coil spring mounted to one side of the housing and having one end thereof formed with a straight elongation portion extending from a wound portion of said coil spring toward an opposite side of the housing, a receiving portion bent 90 degrees to said straight elongation portion and extending in an axial direction of the wound part of said coil spring, and a movable contact portion bent 90 degrees to said receiving portion and at an upright angle to said straight elongation portion and extending back toward said one side of the housing above said clip; and

a pushbutton movably mounted so as to project upright from an upper portion of the housing and having an engaging portion at a lower end thereof which is engaged with said receiving portion of said coil spring for pushing said movable contact portion into electrical contact with said clip when said pushbutton is depressed.

4,684,776

METHOD AND APPARATUS FOR UNIFORM MICROWAVE BULK HEATING OF THICK VISCOUS MATERIALS IN A CAVITY

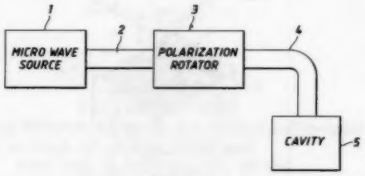
Nigel A. Heard, Chester, England, assignor to Shell Oil Company, Houston, Tex.

Filed May 1, 1986, Ser. No. 857,873

Claims priority, application United Kingdom, May 1, 1985, 8511049

Int. Cl.⁴ H05B *6/74*

U.S. Cl. 219—10.55 M **6 Claims**



1. A method for uniform microwave bulk heating of thick viscous materials in a cavity not specifically designed for microwave heating comprising the steps of generating microwaves; passing the generated microwaves through a first waveguide to a polarization rotator; slowly and continuously rotating the direction of polarization of the incoming waves wherein the rotation takes place external to the cavity; and subsequently passing the waves to a second waveguide for feeding the rotated waves into the cavity to be heated.

4,684,777

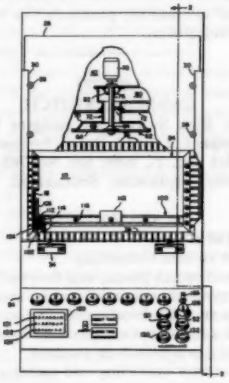
PRODUCT SUPPORT TRAY FOR MICROWAVE PROCESSING

E. Eugene Eves, II, Westford, and Thomas F. Maher, Brockton, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 137,021, Apr. 2, 1980. This application Feb. 1, 1982, Ser. No. 344,470

Int. Cl.⁴ H05B *6/64*

U.S. Cl. 219—10.55 A **16 Claims**



1. In combination:

a microwave oven cavity having an access opening;

means for energizing said cavity with microwave energy;

a door for preventing the escape of said microwave energy through said access opening;

a product support tray suspended horizontally in said cavity; said tray comprising a rigid border frame substantially con-

forming to the shape of said oven cavity in a horizontal plane; and

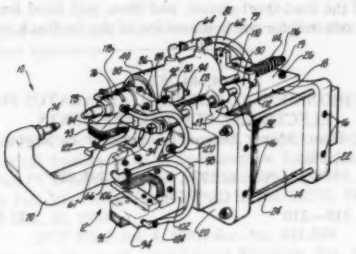
said tray further comprising a thin flexible microwave transparent sheet suspended across and attached to said rigid frame to provide the product support surface of said tray.

4,684,778

RESISTANCE SPOT WELDING GUN AND TRANSFORMER ASSEMBLY

Dimitrios G. Cecil, 1277 Ashover Dr., Bloomfield Hills, Mich. 48013

Filed Apr. 30, 1984, Ser. No. 605,563
Int. Cl.[4] B23K *11/32*
U.S. Cl. 219—89 **7 Claims**



1. Resistance welding apparatus comprising:

a transformer;

a bracket connected to the transformer and including a pair of ears projecting upwardly from lateral sides thereof;

two guide shafts, one each connected to each pair of ear projections on the bracket;

a cylinder having leg portions extending from sides thereof slidably mounted on said guide shifts, and a pneumatically actuated piston rod in the cylinder;

a first jaw member removably attached at one end to the cylinder, and a first electrode connected to an opposite end of the first jaw member;

a second jaw member connected at one end to the piston rod and a second electrode connected to an opposite end of the second jaw member;

first and second U-shaped rolling shunts, the first shunt being connected between a transformer secondary terminal and the first jaw, the second shunt being connected between another transformer secondary terminal and the second jaw; and

spring means connected to a rear end of the cylinder for adjusting pressure developed between the two electrodes.

4,684,779

LASER WELDING METAL SHEETS WITH ASSOCIATED TRAPPED GASES

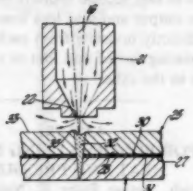
Gregory J. Berlinger, West Lafayette, Ind., and Joseph J. Speranza, Rochester Hills, Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 820,967, Jan. 22, 1986, abandoned. This application Sep. 22, 1986, Ser. No. 910,405
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121 LD **3 Claims**

1. A method of laser welding two sheets of metal galvanized with a coating of zinc, the zinc coating being subject to vaporization in the weld zone at the adjacent surfaces of the sheets into a gas by the heat of the laser and tending to expand through the weld zone, the method comprising the following steps:

placing the sheets of metal with coated surfaces adjacent in position for welding;

directing a laser beam at one of the sheets of metal to create a weld zone of molten metal extending through the one sheet of metal and at least into the other sheet of metal, the heat of the laser beam tending to vaporize the zinc coating into an expanding gas in the weld zone at the adjacent surfaces of the sheets, the expanding gases tending to prevent joining of the molten metal at the adjacent surfaces of the sheets and migrate through the weld zone toward the laser beam to create porosity in the final weld;



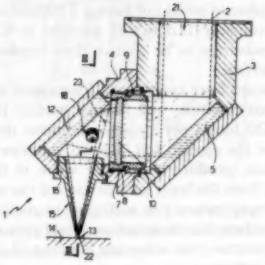
directing a stream of pressurized shield gas at the weld zone, the stream surrounding and being parallel to the laser beam and creating pressure on the surface of the weld zone, the pressure on the surface of the weld zone being sufficient to force the molten metal of the two sheets together and force the expanded gas out of the weld zone in a direction away from the laser beam, whereby a nonporous weld may be created.

4,684,780

LASER BEAM FOCUSING HEAD

Maichi Cantello, Aglié , and Pier Giuseppe Manino, Samone, both of Italy, assignors to R T M Istituto per le Ricerche di Tecnologia Meccanica e per l'Automazione, Italy

Filed Oct. 11, 1985, Ser. No. 786,845
Claims priority, application Italy, Oct. 19, 1984, 68032 A/84
Int. Cl.[4] B23K *26/06*
U.S. Cl. 219—121 LQ **15 Claims**



1. A laser beam focusing head for laser welding materials which vaporize rapidly, comprising:

an unfocused laser beam input (**21**) which emits an unfocused laser beam (**2**);

an open-ended first support means (**3**) located directly downstream from said unfocused laser beam input;

a first reflecting mirror (**5**) disposed on said first support means for intercepting and reflecting said unfocused laser beam from said unfocused laser beam input;

an open-ended second support means (**4**) rotatably connected at its upstream end to the downstream end of said first support means;

a lens (**10**) with a focal point for focussing the the laser beam intercepted and reflected by said first reflecting mirror, said lens being disposed downstream from said first reflecting mirror;

support means for said lens disposed downstream from said first reflecting mirror;

a second reflecting mirror (12) disposed on said second support means and downstream from said lens for intercepting and reflecting the laser beam focused by said lens;

a focused laser beam output (22) for outputting the focused laser beam reflected by said second reflecting mirror, said focused laser beam output being connected to the downstream end of said second support means and said focused laser beam output and said lens being positioned to be at all times directly invisible from each other; and

means for rotating one of said first or second support means in relation to the other.

4,684,781

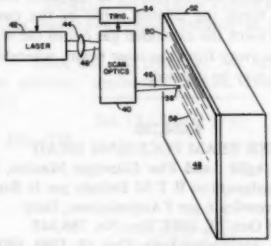
METHOD FOR BONDING USING LASER INDUCED HEAT AND PRESSURE

Michael B. Frish, Acton; Peter E. Nebolsine, Reading, and Anthony N. Pirri, Andover, all of Mass., assignors to Physical Sciences, Inc., Andover, Mass.

Filed Jan. 29, 1985, Ser. No. 695,966

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121 LU **7 Claims**



1. A process for metallurgically bonding a layer of a coating material to a substrate, comprising the steps of:

applying a layer of metal foil having a thickness in the range of approximately 12.5 to 125 microns to a surface of a metallic substrate to be coated, thus creating a foil-substrate interface;

applying pulsed laser radiation of a localized intensity, predetermined duration, and fluence greater than approximately 320 Joules per square centimeter directly to the surface of the applied foil layer to vaporize some of the foil surface, produce a pressure wave in the foil layer traveling from the layer surface toward the substrate, and cause a temperature rise sufficient to melt the foil-substrate interface, the combination of said pressure wave and said temperature rise achieving bonding of said foil layer to said substrate.

4,684,782

CONTROL SYSTEM FOR A CHARGED PARTICLE BEAM APPARATUS

Hidenobu Murakami, and Seiji Yasunaga, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

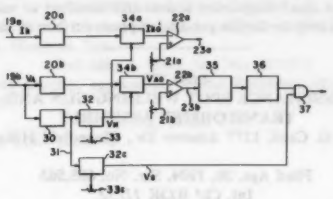
Filed Sep. 11, 1985, Ser. No. 774,735

Claims priority, application Japan, Sep. 19, 1984, 59-198122

Int. Cl.[4] B23K *15/00*

U.S. Cl. 219—121 EA **12 Claims**

1. A control system for a charged particle beam apparatus which comprises a controllable power source for feeding a power to a beam generating part, said controllable power source being subject to feedback control in response to a beam accelerating voltage, wherein when a load-short-circuit takes place due to an electric discharge, a feedback signal in a feedback control line is fixed at a predetermined value corresponding to said feedback signal under the condition before occurrence of the load-short-circuit, and then, said fixed feedback signal is released for the continuation of the feedback control.



4,684,783

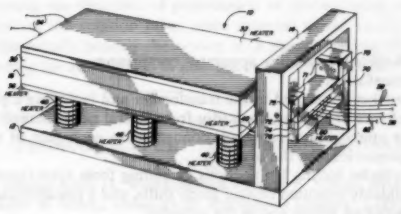
ENVIRONMENTAL CONTROL APPARATUS FOR ELECTRICAL CIRCUIT ELEMENTS

John G. Gore, Mount Dora, Fla., assignor to Sawtek, Inc., Orlando, Fla.

Filed Nov. 6, 1985, Ser. No. 795,488

Int. Cl.[4] F27D *11/02*

U.S. Cl. 219—210 **17 Claims**



1. Environmental control apparatus for an electronic circuit element, said apparatus comprising:

(a) an enclosure for supporting said electronic circuit element;

(b) means including a standoff mounting bracket for supporting said enclosure, said enclosure and said supporting means including an area of high resistivity to heat flow and said standoff mounting bracket defining an area of high heat conductivity; and

(c) means for heating said standoff mounting bracket in order to reduce the flow of heat from said enclosure.

4,684,784

FUSER TEMPERATURE CONTROL

Ernest J. Tamary, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 24, 1986, Ser. No. 855,237

Int. Cl.[4] H05B *1/00*; **G03G** *15/20*

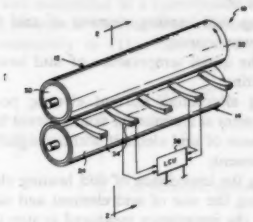
U.S. Cl. 219—216 **4 Claims**

4. In an electrographic copier having fuser apparatus of the type having at least one heated pressure roller for fusing toner images on copy sheets, skive means supported in contact with the roller for stripping copy sheets from the roller; the improvement wherein the skive means is heat conductive and the fuser apparatus further comprises;

temperature sensitive means in heat-conducting contact with said skive means (1) for sensing the temperature change of the roller by heat conduction along said skive means and (2) for generating an electrical signal representative of said temperature change;

temperature control means responsive to said generated electrical signal from said temperature sensing means to

maintain the temperature of the surface of said fuser roller within predetermined limits so that the toner is completely



fused to the copy sheets as the sheets are fed through the fuser apparatus.

4,684,785

ELECTRIC BLANKETS

Graham M. Cole, Lymington, England, assignor to Dreamland Electrical Appliances PLC, Southampton, England

PCT No. PCT/GB85/00303, § 371 Date Feb. 28, 1986, § 102(e) Date Feb. 28, 1986, PCT Pub. No. WO86/00776, PCT Pub. Date Jan. 30, 1986

PCT Filed Jul. 8, 1985, Ser. No. 841,539

Claims priority, application United Kingdom, Jul. 10, 1984, 8417547

Int. Cl.[4] H05B *3/54*

U.S. Cl. 219—212 **10 Claims**

1. An electric blanket including a heating element comprising at least two elongate electrodes separated by a heating material that has a positive temperature coefficient of resistance and that will generate heat when a current passes through it, wherein at least one of the electrodes is a resistive heating conductor and the electrodes and the heating material are so arranged that heating current supplied to the heating element will flow through both the heating material and through a current path that comprises said at least one of the electrodes and that excludes the resistance of the heating material.

4,684,786

ELECTRICALLY HEATED FUEL PICK-UP ASSEMBLY FOR VEHICLE FUEL TANKS

Joseph M. Mann, and James A. Spitler, both of Fort Wayne, Ind., assignors to Navistar International Corporation, Chicago, Ill.

Filed Aug. 1, 1984, Ser. No. 636,648

Int. Cl.[4] H05B *3/00*; F24H *1/10*; F02M *31/12*; B67D *5/62*

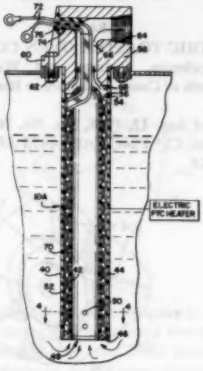
U.S. Cl. 219—297 **8 Claims**

1. A fuel heater assembly immersible into a motor vehicle fuel tank for warming fuel passing therethrough and comprising:

a first tubular member coaxially located within a second tubular member in spaced relation thereto to define a flow path therebetween and interconnected therewith at one end thereof by an annular cap element, said tubular members being substantially coextensive;

said first tubular member having a fuel inlet at said one end, the other end being closed, and a plurality of holes in the immediate vicinity of said annular element and communicating with the space between said tubular members;

an electric heating element disposed in said space between said tubular members and adapted to be connected with an associated vehicle electrical source, said heating element being supported by a plurality of ribs secured to said first tubular element;



the other end of said second tubular member being closed by a connecting fitting having a passage adapted to be connected to a vehicle fuel supply, said passage communicating with said space between said tubular members.

4,684,787

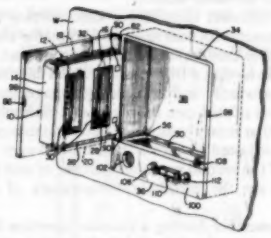
ARTICLE HEATING CABINET

Larry T. Bunting, R.R. 5, P.O. Box 105, Fairfield, Ill. 62837

Filed Aug. 22, 1985, Ser. No. 768,245

Int. Cl.[4] A21B *1/00, 1/22*

U.S. Cl. 219—400 **10 Claims**



1. An article warming device for warming a thick fabric article of the type which resists air flow therethrough and heat transfer thereacross comprising:

rack means in the form of a unitary hollow shell having spaced apart front and rear panels and connecting end walls and sidewalls between said front and rear panels and including an upper section for supporting the article in a draped manner to permit pendant portions of the article to hang downwardly therefrom wherein the article has an inside surface supported on said upper section and an outside surface opposite thereto, the weight of the pendant portions being effective to compress a midportion of the article to increase the resistance to air flow from the inside surface to the outside surface, said rack means provided with vents extending at least through said top and bottom end walls;

a cabinet having a lower section and an upper open section;

closure means for closing said upper open section to form a warming chamber including means for supporting said rack means in the warming chamber above said lower section; and

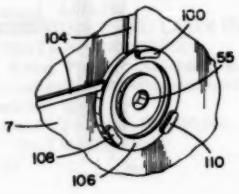
warm air supply means associated with said lower section for supplying warm air from said lower section into said shell whereby the warm air flows through said shell and said vents therein into contact with the inside surface including the midportion of the article.

4,684,788

ELECTRIC TOASTER OVEN CONTROL

William D. Ryckman, Orange, and Walter H. Gordon, Huntington, both of Conn., assignors to Black & Decker, Inc., Newark, Del.

Filed Aug. 12, 1985, Ser. No. 764,761
Int. Cl.[4] F24C *7/08*; A47J *37/08*
U.S. Cl. 219—413 **5 Claims**



1. In an electric oven toaster including heating elements and a thermostat switch which may be set to open when a particular preset temperature has been reached, the improvement comprising:

a. a rotatable cam for setting a threshold temperature of the thermostat switch;

b. said thermostat switch including a first movable temperature sensor, and a second movable member that is positioned by said rotatable cam so as to cause said thermostat switch to open at the threshold temperature that is set by said rotatable cam;

c. a cam follower positioned between said rotatable cam and said second movable member;

d. said cam follower including a slide portion urged into sliding contact with said manually rotatable cam;

e. said rotatable cam having a shaft portion and a circular disc portion having a front surface and a cam surface that extends rearwardly and is in sliding engagement with the slide portion of said cam follower, said cam surface being shaped so that rotary position of said rotatable cam may be manually adjusted to move the cam follower to set the position of the second movable member of said thermostat switch to set the threshold temperature of said oven toaster;

f. a support member having a circular aperture for loosely receiving and supporting the shaft portion of said rotatable cam;

g. a fixed slide projection formed on said support member positioned for engagement with the front surface of said rotatable cam, said slide projection being positioned opposite to the slide portion of said cam follower so that said cam follower continuously urges the front surface of said rotatable cam into contact with said slide projection so that the cam follower accurately senses the thickness of the portion of the rotatable cam with which it is in contact.

4,684,789

THERMOPLASTIC FITTING ELECTRIC WELDING METHOD AND APPARATUS

Dean E. Eggleston, Tecumseh, Okla., assignor to Central Plastics Company, Shawnee, Okla.

Filed Apr. 17, 1986, Ser. No. 853,351
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—497 **17 Claims**

1. A method of electrically heat welding a thermoplastic fitting having an electric resistance heating element disposed therein whereby a predetermined regulated quantity of electric power is supplied to the heating element during the welding process and the making of a high quality weld is insured comprising the steps of:

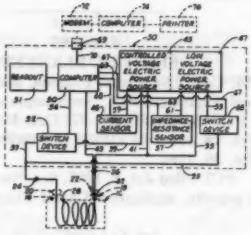
(a) connecting said heating element of said fitting to an electric power source;

(b) sensing the initial temperature of said heating element and said fitting;

(c) supplying alternating current electric power to said heating element at a minimum voltage level for measuring the impedance of said element without significantly heating said element;

(d) measuring the impedance of said heating element;

(e) determining the size of said element and said fitting by comparing the impedance measured in step (d) with predetermined impedances for various sizes of elements and fittings;



(f) supplying electric power to said heating element at a controlled voltage whereby said element is heated;

(g) sensing one or more characteristics of said heating element over the time said controlled voltage electric power is supplied thereto, comparing at least one of said characteristics and said initial temperature of said element and fitting with predetermined characteristics for the size of element and fitting determined in step (e), and comparing at least one of said characteristics at predetermined time intervals with pre-determined characteristics for the size of element and fitting determined in step (e) to thereby control the welding process, determine its duration and determine if the welding process is proceeding abnormally at such time intervals; and

(h) terminating the supply of electric power to said heating element of said fitting at the duration of said welding process or when it is determined that said welding process is proceeding abnormally in step (g).

4,684,790

SMOKE AND/OR HEAT DETECTION APPARATUS CONTAINING THERMAL-SENSITIVE INSULATING COMPOSITION

Milton Greenhalgh, Fairfield, Conn., assignor to General Electric Company, Bridgeport, Conn.

Continuation-in-part of Ser. No. 709,245, Mar. 7, 1987, Pat. No. 4,616,124, and a continuation-in-part of Ser. No. 548,376, Nov. 3, 1983, Pat. No. 4,617,454. This application May 1, 1986, Ser. No. 858,370
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—505 **11 Claims**

1. A smoke and/or heat detection apparatus comprising:

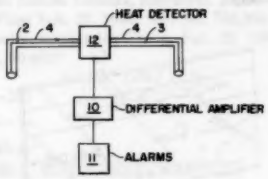
(a) smoke and/or fire detection means;

(b) a first reference wire conductor and a second wire sensing conductor, both of which are connectable to an electric power source and operatively connected to said smoke and heat detection means,

(c) signal means; and

(d) actuating means operatively associated with the signal means and the first and second wires to actuate the signal

means when D.C. resistance between the first and second wires exceeds a predetermined maximum, said first and second wires being uniformly spaced apart over their full lengths and embedded in a coextensive body of thermal sensitive polymeric material selected from the group consisting essentially of (1) a thermosetting acrylonitrile-



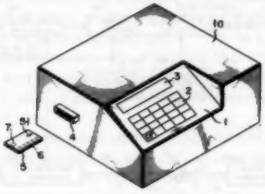
butadiene rubber containing at least one percent by weight of acrylonitrile, and (2) a thermoplastic blend of a polyvinyl chloride and an acrylonitrile-butadiene rubber containing at least one percent of acrylonitrile, in which the thermoplastic rubber (1) after curing and thermoplastic blend (2) contain substantially no sulfur.

4,684,791

CARD IDENTIFICATION SYSTEM

Hiroyasu Bito, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Oct. 1, 1985, Ser. No. 782,518
Claims priority, application Japan, Oct. 12, 1984, 59-213571
Int. Cl.[4] G06K *5/00*
U.S. Cl. 235—380 **25 Claims**



1. A card identification system comprising:

an identification card having first and second data-storing means comprised of different types of memory media for storing, respectively, at least one of first and second identification data;

an identification terminal having first data access means for accessing said first data-storing means, and second data access means for accessing said second data-storing means, at least one of said first and second data access means including: (a) data transducer means; (b) determining means for detecting the presence or absence of said first and second identification data; and (c) data selection means for deactivating an access operation to said first data-storing means by said first data access means and activating an access operation to said second data-storing means by said second data access means upon said determining means detecting absence of data in the first data-storing means;

input means for inputting identification information; and

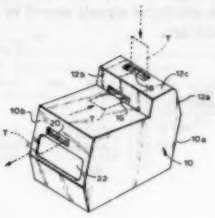
identification means for identifying at least one of said first and second identification data with said identification information.

4,684,792

MULTIPLE INPUT COMPACT TICKET PROCESSOR

Richard C. Nickels, Jr., Hampstead, Md., assignor to General Instrument Corp., New York, N.Y.

Filed Dec. 2, 1985, Ser. No. 803,308
Int. Cl.[4] G06K *7/00*
U.S. Cl. 235—384 **25 Claims**



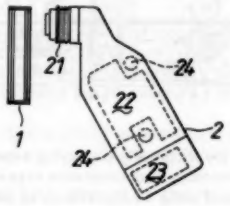
1. A ticket processor of the type adapted to receive customer-marked tickets comprising a housing having an input portion and a processing portion, said input portion having first, second, and third surfaces, ticket input means situated within said input portion, ticket reader means, ticket printer means, and ticket output means situated within said processing portion, said ticket input means comprising first, second, and third input slots located on said first, second and third surfaces, respectively, said first and second surfaces facing in substantially opposite directions and said third surface facing in a direction substantially perpendicular to said first and second surfaces.

4,684,793

DEVICE FOR ACQUIRING, STORING AND EVALUATING THE DATA OF A CHECKING PROCESS

Peter Kamhuber, Vienna, Austria, assignor to Erste Wiener Wach- und Schliessgesellschaft AG and "Niwe" Ing. Kamhuber & Co. KG, both of Vienna, Austria

Filed Jun. 7, 1985, Ser. No. 742,282
Claims priority, application Austria, Jul. 13, 1984, 2282/84
Int. Cl.[4] G06K *7/08*
U.S. Cl. 235—449 **6 Claims**



1. A checking apparatus, comprising:

a data transmitter forming one of a plurality of such transmitters disposed at fixed locations to be checked, each of said data transmitters having an elongated track magnetically encoded with data in a magnetically activatable form specific to the respective location and arrayed along the respective track;

a portable data-acquisition device formed with a head shiftable along the tracks of said data transmitters and including:

a magnetic-field generator in said head for magnetically activating the magnetic coding arrayed along each track upon shifting of said head therealong in a given direction,

a code detector in said head behind said magnetic-field

generator with respect to said direction for detecting the respective code, and

a battery-powered electronic storage connected to said code detector for storing electrical signals represented by the code detected by said code detector; and

a data-evaluating device operatively couplable with said portable data-acquisition device for transfer of data represented by the electrical signals stored in said storage for evaluating said data.

4,684,794

TRANSPORT DEVICE FOR CARD-LIKE RECORDING MEDIUM

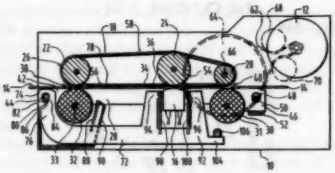
Guenter Holland-Letz, Paderborn, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Filed Sep. 30, 1985, Ser. No. 782,240

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1984, 3441849

Int. Cl.[4] G06K *7/08*

U.S. Cl. 235—449 **20 Claims**



1. A device for frictionally conveying a card-shaped, essentially ridged recording medium relative to an evaluation device which is disposed along a path between an inlet and an outlet, comprising:

a linear conveyor path **(36)** which is bordered on (the) one side thereof by a section of a closed-loop conveyor **(26)** and on the other side thereof by a pressure strip **(28)** which runs approximately parallel to the path **(36)** and is biased toward the conveyor **(26)** with the aid of a pressure device **(52)**, the conveyor **(26)** including a pair of pulleys **(20, 22)** respectively disposed at opposite extremities of the linear conveyor path **(36)** and a conveyor belt **(18)** trained around the pulleys **(20, 22)** the pulleys **(20, 22)** each including a circumferential groove **(130, 132)** therein, the conveyor belt **(18)** including a guide rib **(134)** lying within the circumferential groove **(130, 132)** of each of the pulleys **(20, 22)** and cooperating with the grooves **(130, 132)** to maintain alignment of the conveyor belt **(18)** relative to the pulleys **20, 22)**.

4,684,795

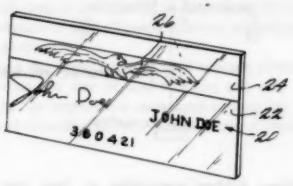
SECURITY TAPE WITH INTEGRATED HOLOGRAM AND MAGNETIC STRIP

Gilbert Colgate, Jr., New York, N.Y., assignor to United States Banknote Company L.P., New York, N.Y.

Filed Jan. 7, 1985, Ser. No. 689,339

Int. Cl.[4] G06K *7/10*

U.S. Cl. 235—457 **14 Claims**



1. An identification card comprising:

a plastic substrate having information embossed thereon and

a magnetic strip mounted on one side of said card for storing information magnetically, said magnetic strip having an optically viewable holographic image thereon.

4,684,796

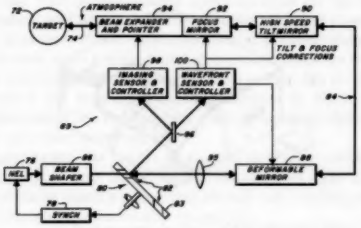
COMMON OPTICAL APERTURE LASER SEPARATOR FOR RECIPROCAL PATH OPTICAL

William M. Johnson, Sudbury, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Jul. 8, 1983, Ser. No. 512,153

Int. Cl.[4] G01C *3/08;* **G02B** *26/08*

U.S. Cl. 250—201 **21 Claims**



14. A common optical aperture laser separator for reciprocal path optical systems, comprising:

a laser source for time sequentially providing pulses of high-energy coherent substantially collimated and generally parallel rays of light in a first direction defining a first optical path; and

means having a planar specular surface and positioned along the first optical path defining an optical aperture in the region of the intersection thereof with the first optical path for transmitting the pulses of high-energy coherent light unimpeded directly through the optical aperture, and for deviating off of said planar specular surface during the interpulse intervals return substantially collimated and generally parallel rays of optical energy present along a second optical path that is the same as but reciprocal to the first optical path and incident on the optical aperture into a second direction different from said first direction in such a way that the substantially collimated and generally parallel rays of the return optical energy remains collimated after having been deviated by said planar surface.

4,684,797

OPTICAL SYSTEM AND METHOD FOR REDUCING VIBRATION OF AN OBJECTIVE LENS IN AN OPTICAL HEAD ASSEMBLY OF AN OPTICAL READ/WRITE SYSTEM

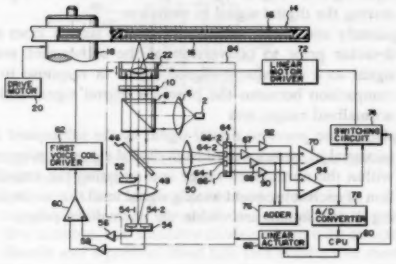
Hideo Ando, and Akihiko Doi, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 25, 1985, Ser. No. 705,306

Claims priority, application Japan, Feb. 29, 1984, 59-37548; Jan. 14, 1985, 60-4397

Int. Cl.[4] G01J 1/20

U.S. Cl. 250—201 **22 Claims**



1. Apparatus for reducing vibration of an objective lens in an optical read/write system having a storage medium with a light reflecting surface having a tracking guide, comprising:

a head assembly including:

light source means for generating a light beam;

objective lens means having an optical axis, adapted for converging the light beam onto said light reflecting surface tracing guide, and for transferring a light beam reflected from said light reflecting surface;

means for moving said objective lens means in a direction parallel to said optical axis, and in a direction perpendicular to said optical axis; and

photodetector means for receiving the transferred light beam and providing an error signal indicative of vibration of said objection lens means perpendicular to said optical axis;

means for driving said optical head assembly in said direction perpendicular to said optical axis; and

processing means for (a) receiving said error signal from said photodetector means, (b) controlling said means for moving to cause said objective lens means to move in said direction perpendicular to said optical axis to reduce vibration of said objective lens means in response to said error signal, and (c) controlling said means for driving to cause said optical head assembly to move in said perpendicular direction.

4,684,798

PERFORMANCE IMPROVEMENT FOR CAMERA AUTOFOCUS

Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 3, 1985, Ser. No. 783,895

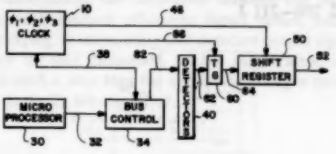
Int. Cl.[4] G01J 1/20

U.S. Cl. 250—201 **10 Claims**

1. A system having clock means producing synchronous signal outputs, control means operable to product first and second command signals and light responsive detector means to begin sensing light from a remote object at a first time T_1 and to build a charge of magnitude indicative of the light received until a second time T_2 when the charge is transferred to utilization apparatus, comprising:

first means connecting the control means to the clock means to present the second command signal thereto, the clock means producing a synchronous transfer signal at a time T_2 upon receipt of the second command signal;

second means connecting the clock means to the detector means to present the transfer signal thereto and cause the transfer of charge from the detector means to the utilization apparatus; and



third means connecting the control means to the detector means to provide the first command signal asynchronously thereto at time T_1 to cause the detector means to begin sensing light.

4,684,799

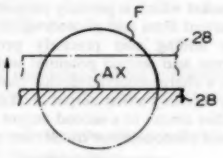
FOCUS DETECTION METHOD INVOLVING CUTTING MORE THAN HALF OF LIGHT BEAM REFLECTED FROM DISC

Masami Emoto, and Hideo Inuzuka, both of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 533,723, Sep. 19, 1983, abandoned. This application Jun. 30, 1986, Ser. No. 880,373

Int. Cl.[4] G01J 1/20

U.S. Cl. 250—201 **9 Claims**



1. A method of detecting a focus of optics associated with an optical pickup, comprising the steps of:

(a) turning light issuing from a laser into a parallel flux;

(b) splitting the parallel flux by means of a polarizing beam splitter;

(c) converting the flux split by polarization to an information recording medium through a $\frac{1}{4}$ wavelength plate and an object lens;

(d) transmitting light reflected by the recording medium through the object lens and the $\frac{1}{4}$ wavelength plate along an optical axis so as to form a parallel flux;

(e) converging the parallel reflected flux by a converging lens;

(f) cutting 60-95% of the converged reflected flux by means of a light intercepting plate which intercepts a central part of the converged reflected flux surrounding the optical axis and passes at least a peripheral part of a minor segment of a circular cross-sectional area of the converged reflected flux;

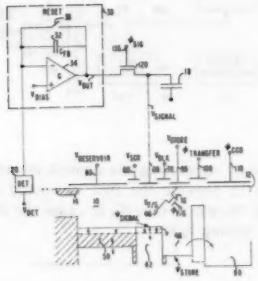
(g) causing the passed part of the reflected flux to converge to a light receiving element to form a light receiving surface in a spot having a predetermined area; and

(h) dividing the area of the light receiving spot into at least two sections and performing a control such that the adjacent sections of the light receiving spot receive a same quantity of light.

4,684,800
LOW-NOISE CHARGE-INJECTION METHOD AND APPARATUS FOR IR CCD SCANNING

Arthur L. Morse, Hawthorne, and Niels A. Thompson, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 14, 1986, Ser. No. 839,398
Int. Cl.[4] H01J *40/14*; H01L *29/78*
U.S. Cl. 250—211 J **14 Claims**



1. A method of low-noise charge injection for use with a charge-coupled device in an imaging system, including the steps of:

peroidically integrating the current from a photodetector during a dwell time period of said photodetector with a photodetector amplifier circuit while maintaining a substantially constant bias on said photodetector;

periodically filling a first potential well with a first amount of charge;

periodically spilling a second amount of charge from said first potential well into a second potential well to form a charge packet which is pecisely proportional to said integrated current from said photodetector;

periodically adding said precisely proportional charge packet from said second potential well to a preexisting charge in a charge-coupled device channel; and

periodically resetting a first output level of said photodetector amplifier circuit to a second output level at the beginning of said photodetector dwell time period.

4,684,801
SIGNAL PRECONDITIONING FOR TOUCH ENTRY DEVICE

Arthur B. Carroll; Stewart E. Hough, both of Georgetown; Paul R. Hunter, Austin; John K. Carstedt, Round Rock; Sam R. Shaw, Austin, and James E. Garrett, Round Rock, all of Tex., assignors to Carroll Touch Inc., Round Rock, Tex.

Filed Feb. 28, 1986, Ser. No. 835,015
Int. Cl.[4] G09G *1/28*
U.S. Cl. 250—221 **12 Claims**

11. A method of detecting an input to a touch sensitive device comprising an array of light emitters and an array of light detectors located on the periphery of a display field, the light emitters and the light detectors being configured in aligned emitter/detector pairs, such that intrusion of an opaque element into the display field blocks light between associated emitters and detectors in at least one emitter/detector pair, the method comprising the steps of:

sequentially energizing emitter/detector pairs prior to intrusion of an opaque element;

converting an analog signal from each detector to a digital signal and inputing the digital signal into digital computing means;

comparing each digital signal with a normalized range and storing the digital signal in memory;

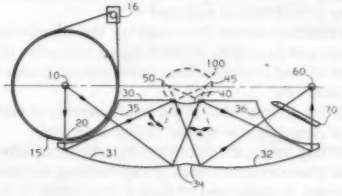
separately amplifying subsequent analog signals from each detector prior to conversion of the subsequent analog signal to a subsequent digital signal in response to the comparison between the previous digital signal and the normalized range; and

replacing the previous digital signal by the subsequent digital signal in memory until each digital signal in memory is within the normalized range and updating the amplification of each subsequent analog signal until the corresponding digital signals are within the normalized range.

4,684,802
ELLIPTICAL FINGER PRESS SCANNER WITH ROTATING LIGHT SOURCE

Paul A. Hakenewerth; Aspi B. Wadia, both of Charlotte, N.C.; James R. Walker, Longmont, Colo., and James M. White, Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 18, 1986, Ser. No. 830,650
Int. Cl.[4] H01J *3/14*; G06K *9/00*
U.S. Cl. 250—235 **15 Claims**



4. A finger press scanner comprising:

light source means for sweeping light rays progressively along an arcuate path,

an optical finger contact surface for supporting a finger to be scanned, said finger contact surface being elliptical and having first and second focal axes for total internal reflection of light rays;

a first elliptical reflective surface positioned to receive light rays from said light source means and reflect the same to said finger contact surface to scan a finger placed thereon, said finger contact surface internally reflecting only those light rays reflected by said first elliptical reflective surface unabsorbed by fingerprint valleys;

light sensing means; and

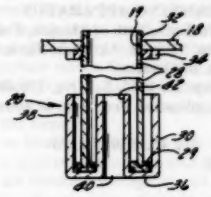
a second elliptical reflective surface positioned to receive light rays internally reflected by said finger contact surface and reflecting the same to said light sensing means whereby said sensing means produces data signals indicating detection of fingerprint valleys in response to the presence of internally reflected light rays and indicating detection of fingerprint ridges in response to the absence of internally reflected light rays.

4,684,803

ELECTRODE SEGMENTS FOR CORONA DISCHARGE DEVICES

Wayne Collins, Oconomowoc, Wis., assignor to Pillar Technologies, Inc., Hartland, Wis.

Filed Dec. 9, 1985, Ser. No. 806,464
Int. Cl.[4] H01T 19/04
U.S. Cl. 250—324 19 Claims



1. An electrode segment for a corona discharge device, said segment comprising,

a hollow tubular electrically conductive member,

a cup-shaped insulator mounted on one end of said conductive member, said insulator having a base with an opening therein and a portion fitted into said conductive member,

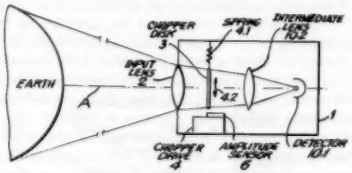
and means for securing said insulator to said conductive member with said opening in the base aligned with the center of said conductive member whereby a cooling medium passing through said opening will pass through the hollow tubular conductive member.

4,684,804

METHOD AND APPARATUS FOR PROCESSING THE OUTPUT SIGNALS OF AN OPTICAL EARTH-HORIZON SENSOR OPERATING IN THE INFRARED RANGE OF AN ORBITING EARTH SATELLITE

Dieter Sodeikat, Baierbrunn, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm Gesellscaft mit beschränkter Haftung, Munich, Fed. Rep. of Germany

Filed Jun. 13, 1985, Ser. No. 745,021
Claims priority, application Fed. Rep. of Germany, Jun. 14, 1984, 3422007
The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.
Int. Cl.[4] G01J 1/34
U.S. Cl. 250—338 2 Claims



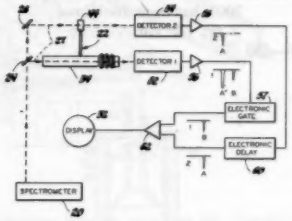
1. Method for processing the output signals of an optical earth-horizon sensor operating in the infrared range of an orbiting earth satellite with respect to variously warm oppositely located earth rims (earth anomaly) for forming an off-course signal which is a measurement of the off-course angle of a line of sight of said earth horizon sensor in relation to a satellite/earth central point connecting line, wherein said earth-horizon sensor comprises a periodically reciprocated chopper disk located in the focal plane of an input lens, said chopper disk having a diameter corresponding to the image of the earth, and a detector collecting the periodically interrupted radiation falling in said input lens, wherein the output signals of said detector are amplified and demodulated with the chopper frequency in order to form said off-course signal, characterized in that in order to reduce error of said sensor off-course signals produced by differently warm earth rims (anomaly), said method comprises operating said earth-horizon sensor with different chopper amplitudes, comparing the respective off-course signals for the chopper amplitudes with the values of the standard sensor off-course signals for chopper amplitudes without said anomaly in a common off-course angle, when the corresponding values for a common off-course angle do not coincide, determining the difference between the measured values and said standard off-course signal values, and selectively amplifying or attenuating said detector output signals, in dependence on said difference, by the same factor in each instance in such a way that the amplitude changes caused by said earth anomaly are cancelled.

4,684,805

METHOD AND APPARATUS FOR MEASURING STABLE ISOTOPES

Peter Shu-Ti Lee, Troy; Richard F. Majkowski, Southfield, and Dale L. Partin, Sterling Heights, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 21, 1985, Ser. No. 767,742
Int. Cl.[4] G01J 1/00
U.S. Cl. 250—343 8 Claims



5. Apparatus for measuring isotope enrichment in different concentrations of stable isotopes in a gaseous sample comprising;

a tunable source of monochromatic radiation for scanning the frequency through a band,

a sample cell arrangement having at least two optical paths through the same sample, the paths having different lengths in a ratio generally corresponding to the inverse ratio of the isotope concentrations,

means for transmitting radiation from the source through the paths,

detector means for measuring the spectral line intensity of an isotope in each optical path, and

means for adjusting the relative path lengths by measured amounts to equalize the measured line intensities, so that the amount of adjustment for a sample gas relative to a reference gas is a measure of isotope enrichment.

4,684,806

RHENIUM LINED GEIGER-MUELLER TUBE

Nicholas M. Mitrofanov, 7911 Newport Ave., Parma, Ohio 44129

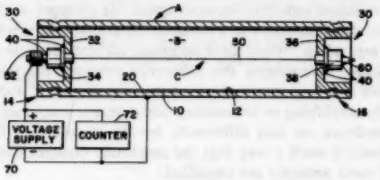
Filed May 1, 1985, Ser. No. 729,356
Int. Cl.[4] H01J 47/08
U.S. Cl. 250—374 10 Claims

1. A Geiger-Mueller radiation detector comprising:

a cathode including a cylindrical sleeve of stainless steel having a first end, a second end, and an interior surface;

a thin layer of rhenium plated on the cathode interior surface;

an anode extending longitudinally through the cathode in a spaced relationship thereto;



a gaseous mixture disposed between the cathode and the anode, the gaseous mixture including a primary component of inert gas and a minor component of halogen gas.

4,684,807

FLOW CONTOURED ELECTRON CAPTURE DETECTOR CELL

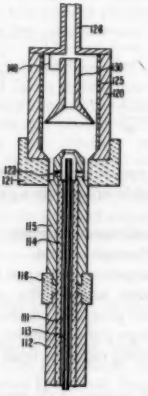
Gregory J. Wells, Suisun, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 522,081, Aug. 11, 1983, abandoned. This application May 13, 1985, Ser. No. 733,854

The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.

Int. Cl.[4] G01N *27/66*

U.S. Cl. 250—381 **12 Claims**



1. An electron capture detector cell for use with a source of sample-bearing gas to be analyzed, and a source of make-up gas to aid in moving and isolating said sample-bearing gas, said cell comprising:

a tubular body with a gas exit at one end;

an anode at the other end of said tubular body;

a radioactive source arranged about the inner surface of said tubular body;

gas introduction means at said anode end of said tubular body for establishing an initial gas flow pattern within said tubular body in which sample-bearing gas is emitted centrally axially while being surrounded by a flow of axially-directed make-up gas moving toward said exit; and

a structure made of electrically conductive material, located within said tubular body, electrically and physically defining an active region in said tubular body adjacent to said anode in which said sample-bearing gas is subject to bombardment of electrons from said radioactive source within said active region permitting detection of current variations as the constituents of said sample-bearing gas change; said structure inhibiting said flow of sample-bearing gas from contacting the walls of said tubular body while within said active region and for inhibiting recycling of gas from the portions of said tubular body not within said active region into said active region.

4,684,808

SCANNING SYSTEM FOR A PARTICLE BEAM SCANNING APPARATUS

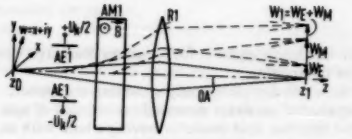
Erich Plies, and Gerd Kuck, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 20, 1985, Ser. No. 778,486

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 3434776

Int. Cl.[4] H01J *3/26*

U.S. Cl. 250—396 R **16 Claims**



1. In a scanning lens system for a scanning particle beam device having deflection elements and lenses for corpuscular radiation, the improvements comprising dynamically deflecting dipole elements being disposed in the particle beam directly preceding at least one imaging lens so that the isotropic deflection chromatic aberration of the dynamically deflecting dipole element compensates the isotropic off-axis chromatic aberration of at least one imaging lens and whereby at least one imaging lens forms an image rotation-free system.

4,684,809

METHOD OF ADJUSTING OPTICAL COLUMN IN ENERGY BEAM EXPOSURE SYSTEM

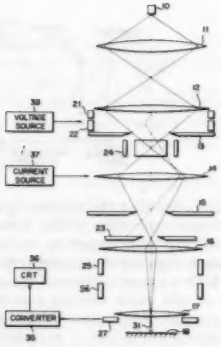
Mamoru Nakasuji, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 20, 1985, Ser. No. 778,243

Claims priority, application Japan, Sep. 29, 1984, 59-204828

Int. Cl.[4] H01J *37/00*

U.S. Cl. 250—492.2 **7 Claims**



1. A method of adjusting an optical column in a system for exposing a target with an energy beam, said optical column comprising:

means for emitting the energy beam toward the target;

means for blanking the energy beam by deflecting the en-

ergy beam from said energy beam emitting means in accordance with a voltage applied thereto;

first and second aperture masks each having an aperture for shaping the energy beam;

first lens means for forming an aperture image of said first aperture mask on said second aperture mask;

second lens means for reducing and then projecting an overlaying image of the aperture images of said first and second aperture masks into the target in accordance with a given current, thereby forming a beam spot corresponding to the overlaying image on the target; and

a beam forming deflector, arranged between said first and second aperture masks, for changing an overlaying beam, thereby changing the size and shape of the beam spot formed on the target;

comprising the steps of:

applying no blanking voltage to said blanking means;

detecting a position of the beam spot formed on the target;

applying the blanking voltage to said blanking means;

detecting another position of the beam spot on the target to obtain positional deviation of the beam spot during a transition period; and

adjusting the given current applied to said first lens means to set the positional deviation of the beam spot on the target at substantially zero.

4,684,810

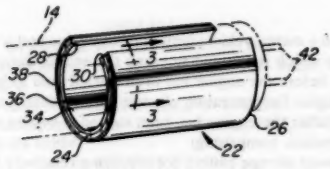
X-RAY SHIELD FOR FLUORESCENT LIGHT TUBE

Ina E. Fisher, 411 NW. 4th St., Andrews, Tex. 79714, and Richard C. Raney, 2600 Culver, Midland, Tex. 79701

Continuation of Ser. No. 963,331, Nov. 24, 1978, abandoned. This application Apr. 4, 1983, Ser. No. 436,483

Int. Cl.[4] G21C *11/00*; G21F *1/00*

U.S. Cl. 250—515.1 **1 Claim**



1. In a fluorescent light tube having opposed ends, electrical contact means at each of said opposed ends by which the tube can be supportedly mounted in a light fixture, a cathode located within each marginal end of the tube in electrical contact with said contact means; the combination with said fluorescent tube of an external and removable X-ray shield;

said shield being generally cylindrical in geometrical configuration; said shield includes a layer of metal having a thickness which substantially prevents X-rays from passing therethrough; said shield being of a size to be telescopingly received in a removable manner about the exterior of the tube so that said shield is supported on the exterior wall surface of the tube and at the marginal end portions of the tube in radially spaced relationship respective to the cathode thereof;

said shield has an inside diameter which is substantially greater than the outside diameter of said tube so that the shield is loosely and slidably received by the marginal end portions of the tube;

said shield is of sandwiched construction and includes a generally cylindrical support means which supports said layer of metal thereon; said layer of metal is a sheet of lead which is coextensive with and bonded to said cylindrical support means;

said cylindrical support means comprises a continuous piece of material, the circumference being made discontinuous by the provision of only one longitudinal slot which provides adjacent longitudinally extending edge portions; the slot being smaller than the diameter of the tube so that the edge portions can be sprung apart to enable the tube to be received through the slot so that the cylindrical support means can be placed about the tube while the tube is mounted in the fixture; and X-rays are therefore substantially intercepted by the shield and cannot be emitted from the fixture;

said cylindrical support means of said shield includes a cylindrical self-supporting cardboard support means which supports said layer of sheet lead thereon; the length of said cardboard support means is substantially twice the diameter of the tube;

said layer of sheet lead is bonded to the exterior of said cardboard support means.

4,684,811

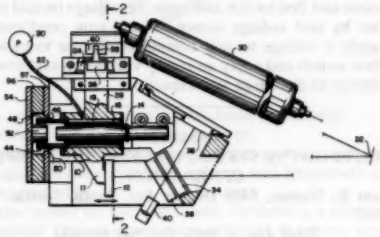
FRICTIONLESS TRANSLATIONAL BEARING FOR OPTICAL INSTRUMENT ELEMENT

Charles F. deMey, II, West Redding, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Apr. 25, 1986, Ser. No. 855,995

Int. Cl.[4] H02K *5/16, 7/08*

U.S. Cl. 250—561 **11 Claims**



1. A frictionless bearing structure for translational movement of an optical instrument element carrier including a cylindrical air bearing for supporting the optical instrument element carrier, a linear drive motor for determining the translational position of said carrier, and a frictionless magnetic repulsion positioning means for determining the rotational versus translational position of said carrier.

4,684,812

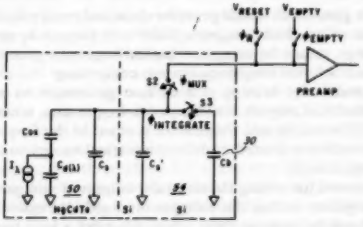
SWITCHING CIRCUIT FOR A DETECTOR ARRAY

Claude E. Tew, Dallas, and Adam J. Lewis, Jr., Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 528,207, Aug. 31, 1983, abandoned. This application Apr. 15, 1986, Ser. No. 851,918

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—578 **10 Claims**



1. An infrared detector array, comprising:

(a) a plurality of pixels arranged into rows and columns;

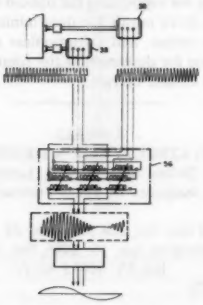
(b) a plurality of row conductors, a row conductor along each row of pixels;
(c) a plurality of column conductors, a column conductor along each column of pixels;
(d) a plurality of third conductors, a third conductor along each column;
(e) each of said pixels including:
i. a first capacitor formed by a conductive gate on an insulator layer on a semiconductor member with the semiconductor of bandgap less than the energy of the infrared photons to be detected and with said gate substantially transparent to said infrared photons;
ii. a first switch connected between said gate and said row conductor for the pixel and with the control for said first switch connected to said column conductor for the pixel;
(f) a voltage sensor for each of said row conductors; and
(g) circuitry for detecting infrared photons in a pixel by cycles of (i) apply a voltage to said column conductor to close said first switch; (ii) apply a bias voltage to said row conductor to charge said first capacitor and thereby form a depletion region in said semiconductor member adjacent said gate, (iii) open said first switch to isolate said capacitor and collect photogenerated carriers in said depletion region, (iv) apply a voltage to said column conductor to close said first switch and sense the voltage on said capacitor by said voltage sensor on said row conductor, (v) apply a voltage to said column conductor to close said first switch and apply an empty voltage on said row conductor to discharge said capacitor.

4,684,813

HETERODYNE SYSTEM FOR ELECTRIC POWER GENERATION

William K. Watson, 5409 Denver Ave. South, Seattle, Wash. 98107

Filed Jan. 3, 1985, Ser. No. 688,682
Int. Cl.[4] H02J *1/00*
U.S. Cl. 290—4 A **15 Claims**



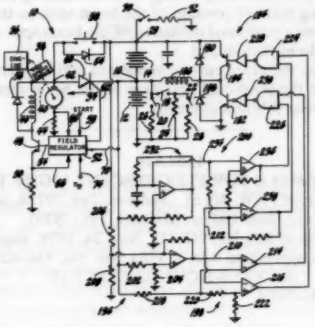
1. In generators which generate electrical energy by relative motion of an electromagnetic field with respect to armature windings, means for using two higher frequency generators to generate a lower frequency output, comprising:
(a) means for causing at least two generators to produce electrical outputs at two separate frequencies, wherein the difference in said frequencies is equal to the frequency at which it is desired to deliver electrical energy to an electrical load;
(b) means for adding the electrical outputs of said generators together so that the voltages involved alternatively reinforce and oppose each other, whereby a beat frequency combination of said voltages is produced whose envelope will vary at a frequency equal to the difference in generator frequencies; and
(c) means for rectifying said beat frequency to produce an electrical output at said envelope frequency for delivery to an electrical load.

4,684,814

MOTOR VEHICLE ELECTRICAL SYSTEM INCLUDING A COMBINED STARTER/GENERATOR

Thomas A. Radomski, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 3, 1986, Ser. No. 881,597
Int. Cl.[4] H02J *7/14*
U.S. Cl. 290—31 **4 Claims**



1. In a motor vehicle including an engine and a starter/generator which is adapted to crank the engine during a starting mode before the engine has been started, and to be driven by the engine for generating electric current during a generating mode after the engine has been started, a system of electrical distribution, comprising:
a lower storage battery for supplying relatively low voltage operating current to low voltage vehicle electrical loads, and an upper storage battery operative in concert with said lower storage battery to supply relatively high voltage electrical current to said starter/generator during said starting mode and to other high voltage vehicle electrical loads;
charging control means connecting said starter/generator to the lower and upper storage batteries during said generating mode, such that the starter/generator supplies power solely to the lower battery when the engine speed is lower than a reference speed below which the output voltage of the starter/generator is limited, and to the serial combination of the upper and lower batteries when the engine speed is at least as great as said reference speed, thereby to effect battery charging in the most efficient manner; and
charge equalizing means including an energy storage inductor connected to the junction of the upper and lower batteries, and converter means effective (1) when the lower battery becomes depleted due to heavy demand from the low voltage electrical loads to transfer energy from the upper battery to the lower battery through the energy storage inductor, and (2) when the upper battery becomes depleted due to prolonged engine operation below said reference speed or heavy high voltage load demand to transfer energy form the lower battery to the upper battery through the energy storage inductor, whereby the battery states of charge are maintained substantially equal in all vehicle operating conditions.

4,684,815

POWER PLANT DRIVEN BY WAVES

Gary Gargos, 355 W. Windsor Rd., Glendale, Calif. 91204

Filed Jan. 10, 1986, Ser. No. 818,091
Int. Cl.[4] F03B 13/12
U.S. Cl. 290—53 4 Claims

1. A power plant driven by waves, comprising

a platform;

a floating structure defining a vertical axis, said platform being supported on said floating structure and being pivotally mounted about said vertical axis on said floating structure;

an electrical generator on said platform;

a turbine on said platform coupled with said electrical generator to drive said electrical generator;

a plurality of floats arranged seriatim with a first said float coupled to said platform;

a plurality hinges fixed to said floats pivotally mounting adjacent said floats together about horizontal axes; and

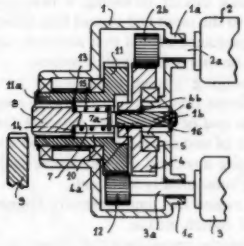
hydraulic cylinders extending between adjacent said floats and laterally spaced from said hinge axes, each said hydraulic cylinder having a piston pinned to a said float and a cylinder pinned to an adjacent said float, said hydraulic cylinders being hydraulically coupled with said turbine.

4,684,816

STARTER WITH TWO MOTORS

Alfred B. Mazzorana, 12 Rue Fernand Léger, FR - 69200 Venissieux, France

Filed Nov. 21, 1985, Ser. No. 800,196
Claims priority, application France, Dec. 6, 1984, 84 18848; Dec. 7, 1984, 84 18954
Int. Cl.[4] F02N 11/02
U.S. Cl. 290—38 R 12 Claims



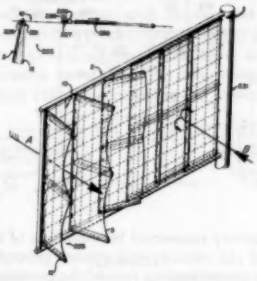
1. A starter apparatus for combustion engines having crown wheels comprising a first drive means, first gear means drivingly engaged by said first drive means, an actuator means rotatably engaged by said first gear means, means for moving said actuator means from a rest position axially outwardly with respect to said first gear means in response to said actuator means being rotated by said first gear means, said actuator means having means for drivingly engaging the crown wheel of the engine, a second drive means, second gear means drivingly engaged with said second drive means, said second gear means being drivingly connected to said actuator means when said actuator means is in engagement with the crown wheel of the engine and when second drive means is activated, said second gear means causing said actuator means to return to said rest position when said first drive means is deactivated and while said second drive means remains activated.

4,684,817

VALVULAR SAIL POWER PLANT

John M. Goldwater, 119 W. Taylor, Hobbs, N. Mex. 88240

Substitution of Ser. No. 621,206, Aug. 23, 1984, abandoned, which is a continuation of Ser. No. 313,576, Oct. 21, 1981, abandoned.
This application Mar. 11, 1985, Ser. No. 710,499
Int. Cl.[4] F03B 3/14; F03D 3/00, 9/02
U.S. Cl. 290—55 26 Claims



1. A vertical-axis feathering windmill, comprising:

(a) at least one open framework vane;

(b) at least one flexible sheet having at least one vertical edge, said sheet rotatably held on said framework along one said edge;

(c) spar means for each said sheet, comprising a plurality of resilient horizontal members attached in spaced equidistant relationship along the vertical length of said sheet and attached so that the sheet is able to billow between spars; and

(d) resilient means between the sheet and spar combination and its corresponding framework vane biasing said sheet and spar combination towards the framework such that wind on the leeward side of the windmill adds to its rotation, said sheet and spar combination otherwise pivotable by the wind.

4,684,818

MOTOR VEHICLE ELECTRICAL SYSTEM PROVIDING MULTIPLE DC VOLTAGES

Richard A. Carlson, Pontiac, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 1, 1986, Ser. No. 891,637
Int. Cl.[4] H02P 9/26
U.S. Cl. 307—10 R 2 Claims

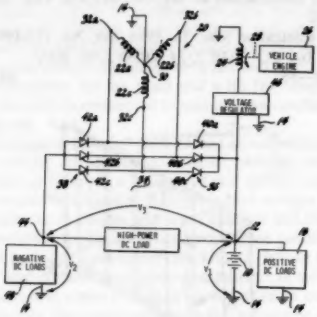
1. A multiple DC voltage electrical system for an automotive vehicle, comprising:

a three-phase AC generator driven by the engine of the vehicle for producing a three-phase AC voltage across three-phase output windings connected in a wye configuration having a neutral node;

connection means for connecting the neutral node of the wye configured three-phase output windings of the generator to system ground such that the amplitude of the three-phase AC voltage alternately swings between positive and negative polarity in respect to system ground;

an ungrounded three-phase full-wave rectifier having a set of input terminals connected with the three-phase output windings of the generator for receiving and rectifying the three-phase AC voltage to develop three distinct DC voltages in respect to a pair of output terminals, the three DC voltages including a first half-wave rectified DC voltage of positive polarity between one output terminal and system ground capable of supplying negative polarity

DC voltage loads in the vehicle, a second half-wave rectified DC voltage of negative polarity between the other output terminal and system ground capable of supplying negative polarity DC voltage loads in the vehicle, and a third full-wave rectified DC voltage between the two output terminals equal to the sum of the first and second half-wave rectified DC voltages capable of supplying a high-power DC voltage load in the vehicle; and



a storage battery connected between one of the output terminals of the rectifier and system ground for charging from the corresponding one of the positive and negative DC voltages put out by the rectifier and for supplying standby power at the corresponding one of the positive and negative DC voltages;

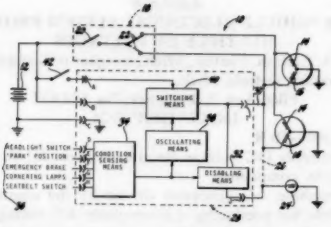
the connection means including a diode poled so as to prevent discharge of the battery to system ground through the high-power DC voltage load when the generator is not operative.

4,684,819

VEHICLE DAYTIME RUNNING LAMPS

Ronald H. Haag, East Detroit, and Edgar H. Schlaps, Washington, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 14, 1986, Ser. No. 918,354
Int. Cl.[4] B60Q *1/02*
U.S. Cl. 307—10 R **9 Claims**



2. A motor vehicle headlight circuit capable of providing power to the high beam headlights in response to a predetermined vehicle operating condition including the vehicle ignition switch being in the on position and the headlight switch being in the off position, thereby improving visibility of the vehicle during daytime driving, comprising:

sensing means for determining whether the predetermined operating condition of the vehicle exists;

oscillating means responsive to the existence of the predetermined operating condition for providing an oscillating signal;

switching means responsive to the oscillating signal for switching on and off the power to the high beam headlights, the oscillating signal being of such a frequency so that light from the high beam headlights is maintained at a substantially constant level of intensity;

indicating means responsive to power being applied to the high beam headlights for indicating to the driver of the vehicle that the high beam lights are operable; and

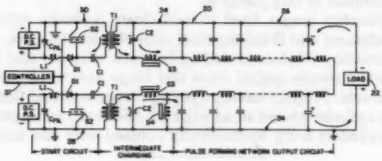
disabling means responsive to the existence of the predetermined operating condition for disabling the indicating means.

4,684,820

SYMMETRICALLY CHARGED PULSE-FORMING CIRCUIT

Vance I. Valencia, San Diego, Calif., assignor to Maxwell Laboratories, Inc., San Diego, Calif.

Filed Feb. 13, 1985, Ser. No. 701,127
Int. Cl.[4] H03K *3/02*
U.S. Cl. 307—106 **8 Claims**



1. A circuit for generating a relatively high voltage, fast rise time pulse for a load, said circuit comprising:

a first pulse-forming network including shunt capacitance and series inductance, said first network including an input end and an output end;

a second pulse-forming network including shunt capacitance and series inductance, and second network including an input end and an output end, said networks being substantially identical;

a first charging circuit including a first charging source connected to the input end of said first network for charging the capacitance of said first network, said first charging circuit having a first switch means;

a second charging circuit including a second charging source different than said first charging source connected to the input end of said second network for charging the capacitance of said second network, said second charging circuit having a second switch means, said charging circuits being substantially identical;

a controller means for simultaneously triggering said first and second switch means;

means for directly connecting the output ends of said networks in series with each other and in series with a load, said output ends being connected to provide bucking voltages upon charging by the respective charging circuits; and

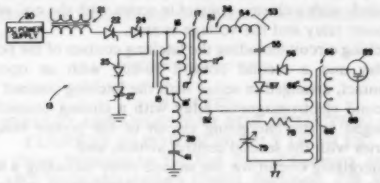
a third switch means connected across the input end of said first network to short-circuit said input end of said first network when said third switch means is closed whereby after interconnection of said network output ends with each other and with said load and after the capacitances of said networks have been charged, closing of said third switch means results in a pulse of high voltage being developed across the load due to superimposition of voltage waves.

4,684,821

RESET CIRCUIT IN A MAGNETIC MODULATOR

John D. Picone, West Islip, and Edward A. Cronauer, Massapequa Park, both of N.Y., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jan. 31, 1986, Ser. No. 825,020
Int. Cl.[4] H03K 5/04
U.S. Cl. 307—106 3 Claims



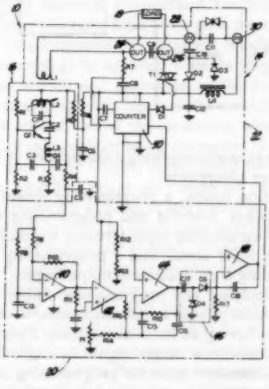
1. A magnetic modulator circuit comprising a power source, a switching reactor means for providing power to a pulse forming network, said switching reactor means comprising cooperative input and output coils, each having a high and low side, a capacitor means for storing current from said power source, said capacitor being electrically connected with the low side of the input coils of said switching reactor means, and a switching means for switching the high side of said input coil selectively to connections including said power source and ground, whereby said capacitor means may be selectively charged from said power source and discharged through said input coil to ground, wherein the improvement comprises an inductor means for passing current, electrically connected in parallel with said input coil, whereby discharge of said capacitor means through said input coil will switch said switching reactor means to a saturated state until said switching means opens, at which time said switching reactor means enters said unsaturated state until energy stored in said inductor means forces a predetermined amount of current, sufficient to switch said switching reactor back into said saturated state, through said input coil to effect resetting of said switching reactor means into said saturated state.

4,684,822

LAMP DIMMER CIRCUIT

Paul G. Angott, 475 Hurst, Troy, Mich. 48098

Filed Feb. 7, 1986, Ser. No. 827,362
Int. Cl.[4] H02B 1/24
U.S. Cl. 307—125 12 Claims



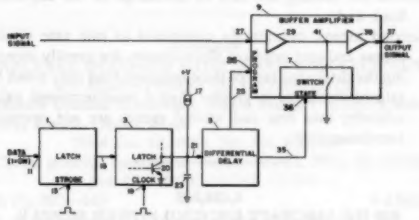
1. A remotely controlled electrical dimmer assembly including a circuit (14) for supplying power to an electrical load (18) requiring electrical power from a constant source, said circuit (14) comprising; radio signal receiver means (14) for electrically supplying power in response to a predetermined radio signal, and including a super-generative detector (16) for receiving said predetermined radio signal, amplifier filter means (20) for amplifying and filtering said predetermined radio signal, switch means (22) for opening and closing said circuit (14) in response to a first duration of said predetermined radio signal for supplying power to said electrical load (18) and for decreasing and increasing the power supply to said electrical load (18) in a series of stepped levels in response to a second duration of said predetermined radio signal, a counter (50) for counting up and down in response to said second duration of said predetermined radio signal and having memory capability for maintaining a determined amount of power to the electrical load (18) in response to said first duration of said predetermined radio signal opening and closing said circuit (14) wherein said counter (50) produces said series of stepped levels with the number of said stepped levels being determined by said second duration, and a triac (T1) connecting said counter (50) and said load (18) for controlling the power to said load (18).

4,684,823

MONOLITHIC SWITCH WITH SELECTIVE LATCH CONTROL

Birney D. Dayton, Nevada City, and Richard Bannister, Grass Valley, both of Calif., assignors to The Grass Valley Group, Inc., Grass Valley, Calif.

Filed Jan. 16, 1984, Ser. No. 571,058
Int. Cl.[4] H03K 17/56; G01R 19/00
U.S. Cl. 307—247 R 24 Claims



1. A switch for selectively switching a signal applied thereto, said switch comprising:

latch means, having a data terminal to receive a data signal having first and second values, a strobe input terminal to receive a strobe signal having first and second values, a clock pulse input terminal to receive a clock signal having first and second values, and an output terminal, the latch means first storing as a preset value the level of the data signal then present at the data input terminal in response to receipt of a strobe signal level of the first value at the strobe input terminal, and subsequently generating a state signal at the output terminal having a value substantially equal to the preset value in response to receipt of a clock signal level of the first value at the clock input terminal; and

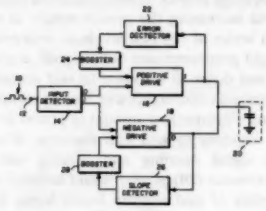
transmission means, having an input port for receiving an input signal, an output port and a state input terminal coupled to the output terminal of the latch means, said transmission means being operative for selectively coupling the signal on the input port to the output port in response to the state signal.

4,684,824

CAPACITIVE LOAD DRIVER CIRCUIT

Gregory O. Moberg, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 2, 1985, Ser. No. 719,090
Int. Cl.[4] H03K *3/01, 17/56, 3/26*
U.S. Cl. 307—270 **5 Claims**



1. A dricer circuit for a capacitive load, said driver circuit having an input terminal for application of an input logic signal, and an output terminal for connection to a capacitive load, and further comprising:

a positive drive subcircuit operatively connected to the input terminal for charging the capacitive load in response to a given logic state at said input terminal;

means for sensing a predetermined difference between an actual and a desired voltage at said output terminal;

first means, operatively connected to said difference sensing means and said positive drive circuit, for greatly increasing the charging rate of the capacitive load only during the existence of said predetermined difference;

a negative drive subcircuit operatively connected to the input terminal for discharging the capacitive load in response to another logic state at said input terminal;

means for sensing the rate of discharge of the capacitive load; and

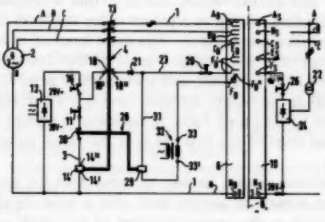
second means, operatively connected to said rate sensing means and said negative drive circuit, for greatly increasing the discharge rate of the capacitive load only when the rate of discharge is greater than a predetermined value, whereby said first and second means are not operative simultaneously.

4,684,825

400 HZ AIRCRAFT GROUND POWER SUPPLY

Klaus Sachs, Osterode, Fed. Rep. of Germany, assignor to Anton Piller GmbH & Co. KG, Osterode, Fed. Rep. of Germany

Filed Apr. 23, 1986, Ser. No. 855,164
Claims priority, application Fed. Rep. of Germany, Apr. 23, 1985, 3514568; Feb. 25, 1986, 3605937
Int. Cl.[4] H02H *5/10;* **H01H** *9/20*
U.S. Cl. 307—328 **9 Claims**



1. 400 Hz aircraft ground power supply comprising

a three phase 400 Hz AC power source,

a flexible cable connected at one side via three phase AC supply contactors to the power supply

and at the other side to a socket connector connectable to a plug connector at the aircraft,

an electromagnetic power relay including a latching contact and one contact for each of the three phase connectors of the cable,

a ground voltage source to which the energizing circuit of the power relay is connectable by means of a first control switch with a closing contact in series with the coil of the power relay and the voltage source,

a latching circuit including the latching contact of the power relay and a second control switch with an opening contact, arranged in series with the latching contact

a second electromagnetic relay with a closing contact arranged in the energizing circuit of the power relay in series with the second control switch, and

an energizing circuit for the second relay including a separate low voltage source and switching means in/on the socket connector and actuated by a plug pin of the plug connector at the aircraft, if the socket connector is in engagement with the plug connector at the aircraft,

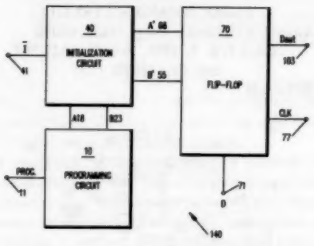
said plug pin being independent of those plug pins connecting the three phases of the power supply, so that the second relay is deenergized and its contact in the energizing circuit of the power relay opens if the socket connector is out of engagement with the plug connector at the aircraft and therefore the energizing circuit of the power relay is deenergized so that its three contactors open and disconnect the AC power supply from the cable.

4,684,826

PROGRAMMABLE ASYNCHRONOUS REGISTER INITIALIZATION CIRCUIT

Michael G. France, Newark; George L. Geannopoulos, San Jose; Robert J. Bosnyak, Mt. View, and Steve Y. Chan, San Jose, all of Calif., assignors to Monolithic Memories, Inc., Santa Clara, Calif.

Filed Jul. 20, 1984, Ser. No. 633,164
Int. Cl.[4] H03K *19/20, 19/084;* **G06F** *7/38;* **G11C** *19/00*
U.S. Cl. 307—272 A **12 Claims**



1. An N bit register comprising a multiplicity of bit registers, each bit register comprising:

an initialization means, a programming means and a data storage means, wherein said programming means comprises a programming input terminal for receiving a programming input signal, and a programming output port for providing a programming output signal;

means for applying said programming output signal to an input terminal of said initialization means, said initialization means having an initialization output port for providing an initialization output signal having a Set or Reset function dependent upon the programming output signal;

means for applying an initialization input signal simultaneously to each initialization means of said N bit register;

means for applying said initialization output signal to a first input terminal of said data storage means;

means for applying a data input signal to a second input terminal of said data storage means;

means for applying a clock input signal to a third input terminal of said data storage means; and

means for providing a data output signal from said data storage means, said data output signal being responsive to the presence of an initialization input signal whereby the status of the programming means is defined independently of the status of the clock input signal or the status of the data input signal in the presence of the initialization input signal.

4,684,827

CIRCUIT ARRANGEMENT FOR DETECTING A CURRENT IN POWER SUPPLY DEVICES

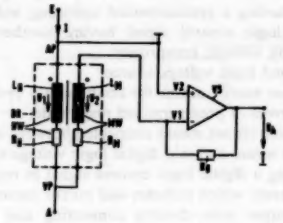
Franz Ohms, Weissach im Tal, Fed. Rep. of Germany, assignor to ANT Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany

Continuation of Ser. No. 626,998, Jun. 29, 1984, abandoned. This application Mar. 7, 1986, Ser. No. 838,200

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1983, 3323905

Int. Cl.[4] G01R *1/20*

U.S. Cl. 307—413 **4 Claims**



1. In a circuit arrangement for detecting a current flowing over a path in a power supply device, which arrangement includes a choke having a primary winding and a measuring winding each having a winding resistance, with each winding having first and second ends and the choke being connected so that the current to be detected flows through the primary winding, an amplifier having first and second inputs and an output, with one of the amplifier inputs being connected to the measuring winding, the primary and measuring windings having substantially identical temperature coefficients of resistance and an effective turns ratio of 1:1 with respect to alternating voltage transformation, the primary winding having its first end connected to be supplied with the current to be detected and its second end connected to the first end of the measuring winding, the first input of the amplifier being connected to the second end of the measuring winding, and the second input of the amplifier being connected to a point in the current flow path in the vicinity of the choke the improvement wherein: said amplifier inputs are connected to said primary winding and measuring winding of said choke in such a manner that said amplifier receives an input signal corresponding to the voltage produced across said primary winding by the current to be detected; and said circuit arrangement further comprises a feedback resistance connected between said output and said first input of said amplifier, said resistance and said primary and measuring windings being connected for causing the temperature dependency of the winding resistance of said measuring winding to compensate the temperature dependency of the winding resistance of said primary winding in such a manner that the voltage at the output of said amplifier is proportional to the current to be detected and is independent of variations in the temperature of said choke.

4,684,828

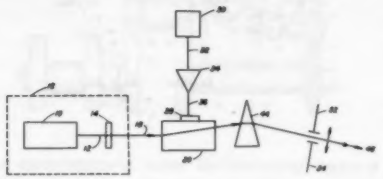
APPARATUS TO TRANSFORM A SINGLE FREQUENCY, LINEARLY POLARIZED LASER BEAM INTO A BEAM WITH TWO, ORTHOGONALLY POLARIZED FREQUENCIES

Gary E. Sommargren, Madison, Conn., assignor to Zygo Corporation, Middlefield, Conn.

Filed Mar. 12, 1985, Ser. No. 710,859

Int. Cl.[4] G02F *1/35*

U.S. Cl. 307—425 **33 Claims**



1. An electro-optical apparatus comprising a light source for providing a linearly polarized single stabilized first frequency optical input beam having an associated intensity; means for providing second and third frequency stabilized electrical signals respectively; means connected to both said input beam providing means and said electrical signal providing means for transforming said input beam into first and second intermediate beams having a frequency difference based on the difference between said second and third stabilized frequencies and having the same linear polarization as said input beam, each of said intermediate beams having approximately one half of said input beam associated intensity; and means optically connected to said transforming means for converting said intermediate beams into an output beam having two orthogonal polarization components having a frequency difference between said components corresponding to said intermediate beam frequency difference.

4,684,829

CMOS TREE DECODER WITH SPEED ENHANCEMENT BY ADJUSTMENT OF GATE WIDTH

Munehiro Uratani, Kashiwara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 10, 1984, Ser. No. 629,338

Claims priority, application Japan, Jul. 12, 1983, 58-127396

Int. Cl.[4] H03K *19/017, 19/094*

U.S. Cl. 307—449 **4 Claims**

1. A semiconductor decoder circuit comprising:

2^{N-1} number of NAND gate means, each having N inputs and collectively developing an output, where N is greater than 2, each said NAND gate means including;

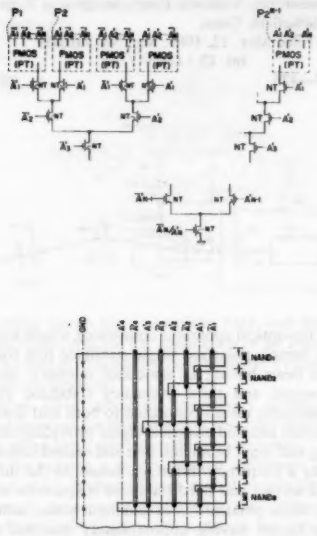
N first transistors, each having a control terminal coupled to receive one of said N inputs and first and second controlled terminals, said first controlled terminals being commonly connected together to said output, said second controlled terminals coupled to receive a supply voltage; and

a unique path of at least N−1 second transistors, said second transistors each having an input gate coupled to receive one of said N inputs and third and fourth controlled terminals, said N−1 second transistors in said unique path being serially connected together by their respective third and fourth terminals to form N−1 stages between said commonly connected first controlled terminals and a reference node;

said unique path between each of said 2^{N-1} number of NAND gate means and said reference node sharing at least some of said N−1 second transistors with the unique path of others of said NAND gate means,

said N−1 second transistors of all of said 2^{N-1} number of NAND gate means being connected in a cascade arrange-

ment with said said unique paths intersecting to connect the N first transistors of each of said 2^{N-1} number of NAND gate means to said reference node at a single point;



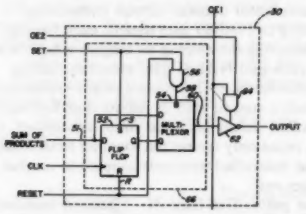
each gate of one of said N−1 second transistors in the N−1 stage having a gate width inversely proportional to the number of transistors in said N−1 stage to thereby make the total gate width of all of said second transistors at each said stage substantially constant.

4,684,830

OUTPUT CIRCUIT FOR A PROGRAMMABLE LOGIC ARRAY

Cyrus Tsui, San Jose; Andrew K. L. Chan, Milpitas; Albert Chan; Mark E. Fitzpatrick, both of San Jose, and Zahid Ansari, Sunnyvale, all of Calif., assignors to Monolithic Memories, Inc., Santa Clara, Calif.

Filed Mar. 22, 1985, Ser. No. 715,214
Int. Cl.[4] H03K *19/20;* **H04A** *9/00*
U.S. Cl. 307—465 **21 Claims**



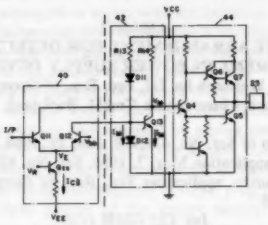
1. A circuit having an output buffer comprising:
a flip flop having a set input lead, a reset input lead, a data output lead, and a data input lead; and
data passing means being coupled to the data output lead of said flip flop and the data input lead of said flip flop, said data passing means providing a signal on an output line indicative of the information present on the data output lead of said flip flop when a signal present on either the set or reset input lead is false or the signals present on both the set and reset input leads are false, said data passing means providing on said output line information indicative of the information present on the data input lead of said flip flop when the signals present on said set and reset input leads are both true.

4,684,831

LEVEL SHIFT CIRCUIT FOR INTERFACING BETWEEN TWO DIFFERENT VOLTAGE LEVELS USING A CURRENT MIRROR CIRCUIT

James R. Kruest, Poway, Calif., assignor to Applied Micro Circuits Corporation, San Diego, Calif.

Filed Aug. 21, 1984, Ser. No. 642,756
Int. Cl.[4] H03K *19/092, 19/086, 19/003, 17/10*
U.S. Cl. 307—475 **15 Claims**



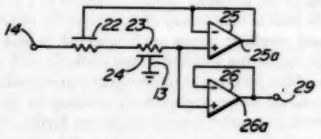
1. An interface circuit for converting a linear differential signal having a predetermined operating voltage range to a digital logic control signal having another predetermined operating voltage, comprising:
a digital logic voltage source;
current mirror means for continuously providing a mirror current of predetermined magnitude;
resistive circuit means connected between said current mirror means and said digital logic voltage source for generating a digital logic control signal in response to a total current which includes said mirror current;
an output node directly connecting said resistive circuit means and said current mirror means through which said total current flows and at which said digital logic control signal is generated; and
input buffer means connected to said output node for generating a differential current and for varying said total current by switching said differential current through said output node in response to said linear differential signal.

4,684,832

ANALOG CIRCUIT IMPROVEMENT IN A DIGITAL INTEGRATED CIRCUIT TECHNOLOGY

Thomas N. Little, Kanata; Lorenzo L. Longo, Nepean, and Sun-Shiu D. Chan, Kanata, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Apr. 29, 1986, Ser. No. 857,222
Int. Cl.[4] H03K *5/00;* **H03F** *3/04*
U.S. Cl. 307—520 **2 Claims**



1. A filter, for analog signals, comprising:
a filter input electrode, for receiving an analog signal;
a filter output electrode, for providing a filtered analog signal;
a first amplifier being a differential amplifier and having an output and inverting and non-inverting inputs;
a first resistive capacitive element and a second resistive capacitive element being connected in series between the

filter input electrode and the non-inverting input to provide a resistive path therebetween, a capacitance electrode of the first resistive capacitive element being connected to the output and the inverting input, and a capacitance electrode of the second resistive capacitive element being connected to ground; and

a second amplifier being connected in voltage follower configuration between the non-inverting input of the first amplifier and the filter output electrode, for providing the filterd analog signal at the filter output electrode.

4,684,833

MIXER STAGE

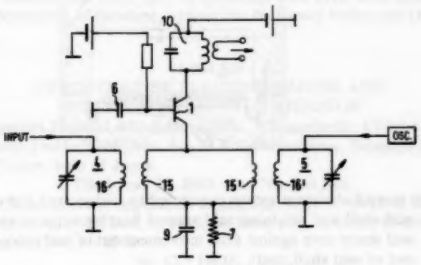
Heinz Rinderle, Heilbronn, Fed. Rep. of Germany, assignor to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Dec. 3, 1984, Ser. No. 677,354

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1983, 3345497

Int. Cl.[4] H03D *13/00*; **H03K** *9/06*

U.S. Cl. 307—525 **9 Claims**



1. A mixer stage for mixing an input signal having a selected signal frequency with an oscillator signal to produce an output signal having a resultant frequency, comprising:

a mixer transistor connected in common base configuration, having an input and an output, and having a selected input impedance;

a source of reference potential and a source of the oscillator signal; and

circuit means connected between said source of reference potential and said mixer transistor input, and connecting said source of the oscillator signal and a source of the input signal to said mixer transistor input, said circuit means having a source impedance located between said source of reference potential and said transistor input; wherein said circuit means comprise:

a first frequency-selective input filter set to the selected signal frequency for supplying the input signal to said transistor input;

a second input filter set to the frequency of the oscillator signal for supplying the oscillator signal to said transistor input;

a coupling coil connected to said transistor input and inductively coupled to one of said filters for applying the signal supplied by said one of said filters to said transistor input, said coupling coil constituting a component of the source impedance and having an inductance selected for causing the source impedance to be greater than the transistor input impedance;

a capacitor connected in series with said coupling coil and forming with said coupling coil a series resonant circuit having a resonant frequency equal to the resultant frequency; and

an RC filter connected to the output of said mixer transistor for suppressing the oscillator signal component of the output signal.

4,684,834

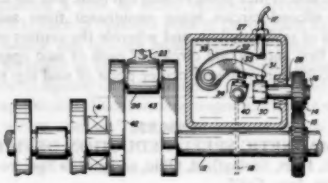
ELECTROMAGNETIC MOTOR

William J. Hartman, Sr., Keystone Heights, Fla., assignor to Robert W. Delong, Orlando, Fla., a part interest

Filed Jan. 2, 1986, Ser. No. 815,463

Int. Cl.[4] H02K *33/00*

U.S. Cl. 310—24 **3 Claims**



1. An electromagnetic motor for conveying electrical energy into rotary motion comprising in combination;

a housing;

a crankshaft rotably mounted in said housing;

a plurality of stators forming cylinders therein mounted onto said housing each said stator having a plurality of metal windings around a sleeve;

a plurality of armatures forming pistons and movably mounted to slide in said stators each said armature having a pluarality of metal windings around a soft iron core;

a plurality of armature piston rods, each piston rod being connected to one armature and to said crankshaft responsive to movement of the armatures in a timed sequence;

a distributor operatively connected to the crankshaft for distributing electrical energy applied to the distributor and for applying electrical energy applied thereto to the stator windings, said distributor being a sealed unit filled with a transformer oil and having at least a pair of electrical contacts moving in said transformer oil responsive to the rotation of the crankshaft to direct electrical energy to each stator in timed sequence whereby electrical arcing is reduced in the distributor of an electromagnetic motor; and

a soft iron dome mounted atop each stator to form a sealed cylinder allowing compression of air therein responsive to the movements of the armature therein.

4,684,835

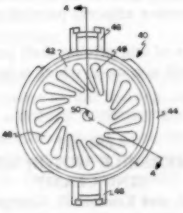
MOTOR COOLING FAN HOUSING

Leonard J. Kline, Jr., Ravenna, and Thomas C. Forsyth, III, Kent, both of Ohio, assignors to Ametek, Inc., Kent, Ohio

Filed Oct. 7, 1985, Ser. No. 785,157

Int. Cl.[4] H02K *9/00*

U.S. Cl. 310—59 **11 Claims**



1. A motor cooling fan housing for a motor assembly, comprising:

a top plate having a center point; and

a cylindrical side portion connected at one end thereof to said top plate;

wherein said top plate is characterized by a plurality of

openings passing therethrough, each said opening being tear-drop shaped and characterized by first and second rounded ends, each of said first and second rounded ends of each said opening respectively defined by first and second circles tangentially interconnected by sides of said opening, each of said first and second circles having a center, the centers of said first circles being equidistant from said center point of said top plate and the centers of said second circles being equidistant from said center point of said top plate, and wherein the centers of each of said first and second circles of each of said openings are not collinear with said center point of said top plate.

4,684,836

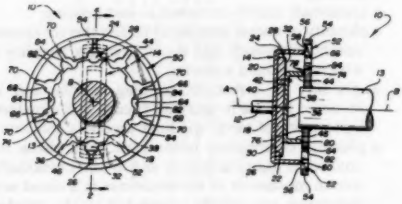
MAGNETIC SPEED REDUCTION DEVICE

Edward E. Hart, Springfield, Ohio, assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Jul. 2, 1986, Ser. No. 881,458

Int. Cl.[4] F16H *5/20*; H02K *7/116*

U.S. Cl. 310—83 **17 Claims**



1. A magnetic speed reduction device comprising:

(a) a rotatable driving shaft,

(b) a driven shaft rotatable about an axis,

(c) stationary pole means including a plurality of pole elements each having at least one stationary pole surface, said pole elements being circumferentially arranged around said axis,

(d) a rotor means operatively coupled to said driven shaft for rotation therewith about said axis, the rotor means being formed of a magnetically permeable material and including a plurality of circumferentially arranged rotor pole surfaces, the number of which is different from the number of stationary pole surfaces, said rotor pole surfaces being disposed in a spaced, generally opposed relation to said stationary pole surfaces, such that a plurality of air gaps are defined therebetween; and

(e) means, mounted for rotation with said driving shaft, for supplying a magnetic flux to a flux path which includes successive adjacent pairs of said pole elements, said rotor means and the air gaps between the pole surfaces of said successive adjacent pairs of said pole elements and corresponding successive adjacent pairs of said rotor pole surfaces,

whereby rotation of said driving shaft produces rotation of said driven shaft at a speed which is less than that of said driving shaft.

4,684,837

ELECTRIC SUBMERSIBLE MOTOR WITH DUAL SNAP RING CLAMP

Edward J. Schaefer, and Kenneth D. George, both of Bluffton, Ind., assignors to Franklin Electric Co., Inc., Bluffton, Ind.

Continuation-in-part of Ser. No. 736,106, May 20, 1985, abandoned. This application Oct. 31, 1985, Ser. No. 793,171

Int. Cl.[4] F04B *39/12*; H02K *15/14*

U.S. Cl. 310—87 **6 Claims**

1. An electric motor comprising

(a) a tubular outer shell,

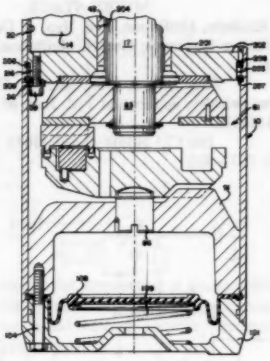
(b) a stator core positioned in said shell and forming an interior rotor cavity, said core being sized to be axially slidable in said shell,

(c) a rotor positioned in said rotor cavity,

(d) first bearing support means in said shell at a first end of said shell and rotatably supporting said rotor,

(e) second bearing support means in said shell at a second end of said shell and rotatably supporting said rotor,

(f) first abutment means connected to said first end of said shell and retaining said first bearing support and said stator core against axial movement out of said first end of said shell,



(g) second abutment means connected to said second end of said shell and retaining said second bearing support and said stator core against axial movement out of said second end of said shell, and

(h) at least one of said abutment means being removable, said second abutment comprising second and third snap rings, said shell having spaced apart annular second and third grooves in the inner periphery thereof, and said second and third snap rings being located in said second and third grooves, respectively, and clamping means on said second bearing support for clamping said second bearing support to said second and third snap rings.

4,684,838

ELECTRIC MOTOR WITH DEFORMABLE DISK BRAKE

Damien Casanova, Barcelona, Spain, assignor to Mavilor Systemes S.A., Coppet, Switzerland

Filed Jul. 16, 1986, Ser. No. 886,187

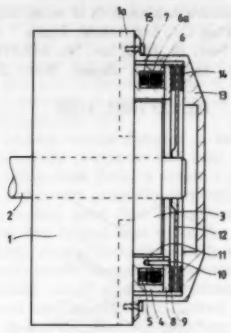
Claims priority, application Switzerland, Jul. 26, 1985, 3257/85

Int. Cl.[4] B60T *13/74*; H02K *7/102*

U.S. Cl. 310—93 **7 Claims**

1. An electric motor with disk brake, consisting of a brake disk (**12**) immovably secured on the motor shaft (**2**), an annular pressing part (**8**) opposite the brake disk (**12**) on one side, which concentrically surrounds the shaft (**2**) and is arranged rotationally fixed but axially movable, a device for generation of the braking force, by which the pressing part (**8**) is pressed against the brake disk (**12**), and a device for easing of the brake, by which the pressing part (**8**) is moved away from the brake disk (**12**), the devices for generation of the braking force and for easing of the brake being accommodated in an annular housing frame (**4**), wherein the annular housing frame (**4**) and the pressing part (**8**) surround the shaft (**2**) of the motor (**1**), with formation of a free annular space, which offers room for a further attaching part (**3**), in particular a tachometer generator and/or a phase-angle sensor, or for a bearing, in particular a ball bearing, carrying the motor shaft (**2**), wherein the brake disk (**12**) consists of an elastically flexible material, wherein a stationary brake part (**13**) is fitted on the side of the brake disk

(12) facing away from the pressing part (8), and wherein the pressing part (8), under the effect of the braking force, presses



an annular rim zone (12*a*) of the brake disk (12), with elastic deformation of the same, against the stationary brake part (13).

4,684,839

STRUCTURE OF ELECTRIC MOTOR AND PRODUCTION METHOD THEREOF

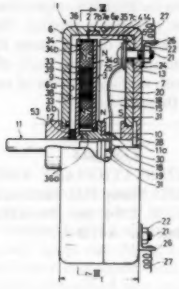
Kiyonori Fujisaki, 195-4 Ooyaguchi, Maatsudo-shi, Chiba-ken, and Toshio Kobayashi, 6-1-13 Kitakarasuyama, Setagaya-ku, Tokyo, both of Japan

Filed Jun. 27, 1985, Ser. No. 749,586

Claims priority, application Japan, Jan. 9, 1985, 60-1882; Jan. 9, 1985, 60-1883; Jan. 9, 1985, 60-1884; Jan. 9, 1985, 60-1885; Jan. 9, 1985, 60-1886

Int. Cl.[4] H02K *21/26*

U.S. Cl. 310—154 **5 Claims**



1. A small disk-shaped electric motor comprising: a case; armature means supported for rotation in said case, said armature means including a plurality of flat armature segments and a first magnetizable disk having a rotation axis and carrying on one side thereof said armature segments around said rotation axis, said armature segments each having generally radial edges extending from said rotation axis, the radial edges of each armature segment subtending an angle of less than 180°, the edges of adjacent armature segments being spaced and generally parallel to each other; permanent magnet means in said case and including a pair of permanent magnet segments, each of generally semicircular form, and a second magnetizable disk arranged coaxially with said armature means and fixedly carrying on one side thereof said permanent magnet segments with an air gap provided between said permanent magnet segments and said armature segments, said semicircular permanent magnet segments being arranged opposite to each other and spaced to define a straight groove of a predetermined axial depth and of constant width extending diametrically of the rotation axis of said armature means, the constant width of said groove being greater than the width of the space between adjacent armature segments; commutator means including a commutator element secured to said armature means for rotation therewith, said commutator element extending axially of said armature means to be in said groove; brush means including a pair of brush elements arranged in said groove, one to each of opposite sides of the rotation axis of said armature means; and holding means including a pair of elastic members arranged in said groove and normally pressing said brush elements against said commutator elements; said first and second magnetizable disks forming magnetic circuits with said armature means and said permanent magnet means, respectively.

4,684,840

SYNCHRONOUS MOTOR HAVING A PERMANENT-MAGNET MODULAR ROTOR

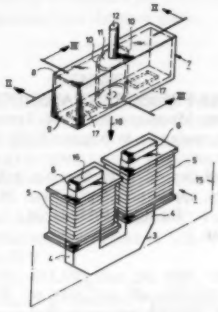
Leo Bertram, Stolberg, Fed. Rep. of Germany, and Hugo Schemmann, Schaesberg, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 18, 1985, Ser. No. 746,215

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1984, 3423777

Int. Cl.[4] H02K *15/16, 15/14*

U.S. Cl. 310—162 **16 Claims**



1. A two-pole single-phase synchronous motor comprising

an electromagnetic exciter part comprising a stator member having a pair of stator limbs, said stator member having a longitudinal axis, each of said stator limbs having a coil thereon and a free end with an end surface, each of said end surfaces being similarly arranged at a selected prescribed angle relative to said longitudinal axis of said stator member; and

a driving unit comprising

a housing,

a permanent-magnet rotor rotatably journalled on its axis in a bearing means in said housing, and

a pair of pole members contained within said housing, each of said members having a pole face and a mounting surface arranged at a given angle with respect to said axis, said pole faces enclosing said rotor inside said housing;

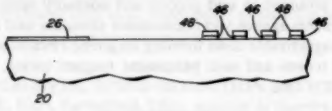
said driving unit being formed as a separate module arranged such that upon placement of said unit on said part, with each of said mounting surfaces abutting a respective one of said end surfaces of said free ends, the orientation of said axis of said rotor within said driving unit relative to said longitudinal axis of said stator member is predetermined by said given angle and the selected prescribed angle of said end surfaces of said free ends of the stator member.

4,684,841

SAW DEVICES INCLUDING RESISTIVE FILMS

Grantley O. Este, Stittsville; Mark S. Suthers, Lanark; Richard W. Streater, and Blair K. MacLaurin, both of Nepean, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Apr. 1, 1985, Ser. No. 718,590
Int. Cl.[4] H01L *41/4*
U.S. Cl. 310—313 B 28 Claims



1. A method of producing a SAW (surface acoustic wave) device comprising the steps of:

forming a resistively conductive film on a surface of a substrate of piezo-electric material; and

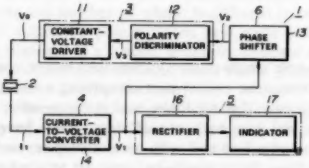
forming at least one IDT (inter-digital transducer) for the SAW device on the resistively conductive film.

4,684,842

GAS PRESSURE TRANSDUCER

Naohiko Maruno; Masakazu Abe, and Tetsuo Ogawa, all of Tokyo, Japan, assignors to Nagano Keiki Seisakusho, Ltd., Tokyo, Japan

Filed Oct. 14, 1986, Ser. No. 918,350
Claims priority, application Japan, Mar. 28, 1986, 61-71861
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—316 6 Claims



1. A gas pressure transducer for measuring the pressure of a gas from the impedance of a piezoelectric crystal placed in the gas, comprising:

voltage stabilizer means for supplying the piezoelectric crystal with an AC constant-voltage signal corresponding to an applied AC signal and having a constant peak amplitude;

current-to-voltage converter means for converting an alternating output current from the piezoelectric crystal into an output voltage signal;

phase shifter means for shifting the phase of said output voltage signal from said current-to-voltage converter means so that the impedance of the piezoelectric crystal is minimal or nearly minimal and for supplying the shifted voltage signal to said voltage stabilizer means; and

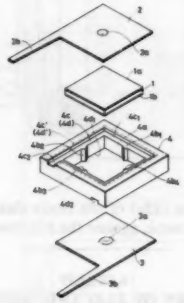
output means for issuing out said output voltage signal from said current-to-voltage converter means as a function of the pressure of the gas.

4,684,843

PIEZO-RESONATOR AND MANUFACTURING METHOD THEREFOR

Kanji Ohya, and Hikaru Achiha, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed Nov. 19, 1982, Ser. No. 442,991
Claims priority, application Japan, Nov. 20, 1981, 56-173907[U]
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—355 1 Claim



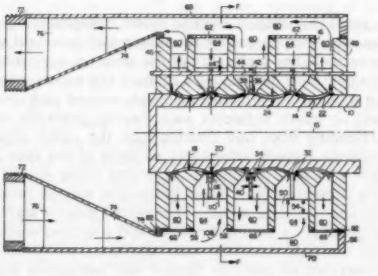
1. A piezo-resonator comprising an insulating frame of synthetic resin material having two major opposed sides and an aperture extending therethrough, lip means located on each major side about the outer periphery thereof to define a pair of recesses in the major sides adjacent said apertures, a piezo-electric ceramic resonator having two electrode surfaces located in said aperture, a pair of terminal plates disposed in said recesses, respectively, in electrical contact with said electrode surfaces of said resonator, a pair of notches located in said lip means on opposite sides of said frame, respectively, in communication with said recesses, said terminal plates each having an outer peripheral edge portion located in a respective recess with said lip means disposed in overlying relation thereto and a leg portion projecting outwardly of said frame through a respective notch, and an insulating outer shell of synthetic resin covering said frame with said leg portion of each terminal strip extending outwardly therethrough.

4,684,844

LIQUID COOLED STATIONARY ANODE TUBES

Arthur H. Iversen, 15315 Sobey Rd., Saratoga, Calif. 95070

Filed Jul. 30, 1984, Ser. No. 635,842
Int. Cl.[4] A47B *81/00*
U.S. Cl. 313—30 26 Claims



1. A liquid cooled, stationary anode tube, comprising:

a. an anode assembly having generally circular symmetry about a longitudinal axis, with an anode heat exchange

region including a heat exchange surface for external cooling of said anode by a moving liquid coolant characterized in part by an associated velocity vector, said heat exchange surface comprised of at least one periodic curve, each such curve with a respective origin and each having generally circular symmetry about said axis, wherein said curve(s) and said respective origin(s) and said velocity vectors lie generally in the same one of any of the planes passing through said axis;

b. coolant diverter means disposed in said heat exchange region outwardly proximate said heat exchange surface for controlling fluid flow to create a pressure gradient having a component generally perpendicular to said heat exchange surface upon flow interaction of said moving liquid with the curved heat exchange surface, wherein said diverter means circumferentially envelops each of said periodic curves to maintain essentially uniform flow characteristics across said heat exchange surface at all points about the circumference thereof; and

c. ducting means for alternate injection and removal of coolant along a flow path across said heat exchange surface.

4,684,845

MAGNETRON CATHODE ASSEMBLY WITH GROOVED INSULATING SPACER

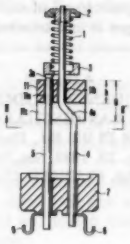
Mamoru Tsuzurahara; Hidetsuyo Baba, and Seiji Kitakaze, all of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 30, 1985, Ser. No. 728,825

Claims priority, application Japan, May 7, 1984, 59-89391; Jul. 27, 1984, 59-155202

Int. Cl.[4] H01J *1/15, 1/88, 19/08, 19/42*

U.S. Cl. 313—341 **10 Claims**



1. A magnetron cathode assembly having a filament for emitting thermoelectrons, upper and lower end shields fixed at upper and lower ends of said filament, a center lead fixed at and connected to said upper end shield, a side lead fixed at and connected to said lower end shield, and an insulating spacer having through holes with which said center and side leads are respectively engaged, wherein said insulating spacer comprises a groove which has a width substantially the same as a diameter of one of said through holes and which clamps a bent portion of at least one of said center and side leads.

4,684,846

LUMINESCENT SCREEN HAVING RESTORED CAVITIES AND DISPLAY TUBE HAVING SUCH A SCREEN

Valère Duchenois, Paris; Michèle Fouassier, Yerres, and Hugues Baudry, Varennes Jarcy, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

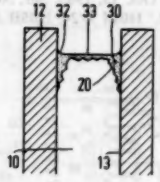
Filed Jun. 24, 1985, Ser. No. 747,626

Claims priority, application France, Jul. 3, 1984, 84 10510

Int. Cl.[4] H01J *29/18, 31/12;* **G02B** *6/08*

U.S. Cl. 313—475 **7 Claims**

1. A luminescent screen comprising an optical fibre plate formed by the reunion of elementary optical fibres constituted by bars of core glass surrounded by one or several cladding glasses, the optical fibre plate being provided with cavities disposed substantially perpendicularly to one of its faces, the cavities being obtained after having partially hollowed out one or several glasses, including the core glass, while preserving at least the cladding glass farthest remote from the core glass, the surfaces thus exposed constituting the walls of the cavities for the part substantially parallel to the axis of the elementary optical fibres, and the bottom of said cavities for the remaining



part, the cavities being then filled by a luminescent product emitting a fluminous flux under the influence of an electron bombardment, characterized in that the bottom of the cavities is covered by a deposit of a restoring material which is transparent to the luminous flux to improve the surface state and the flatness of the bottom of the cavities, and tending to minimize the break at the intersection between the bottom and the wall of each cavity, thereby to improve the luminous flux between the luminescent product and the core glass.

4,684,847

GLASS COMPOSITION SUITABLE FOR USE IN A FLUORESCENT LAMP, TUBE AND LAMP ENVELOPE MANUFACTURED FROM SAID GLASS COMPOSITION, AND FLUORESCENT LAMP HAVING A LAMP ENVELOPE MANUFACTURED FROM SAID GLASS COMPOSITION

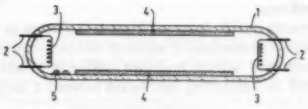
Gijsbertus A. C. M. Spierings, and Eddy F. C. Van Hove, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 681,465, Dec. 14, 1984. This application Nov. 24, 1986, Ser. No. 934,072

Claims priority, application Netherlands, Dec. 20, 1983, 8304361

Int. Cl.[4] H01J *5/04, 61/30;* **C03C** *3/10*

U.S. Cl. 313—493 **2 Claims**



1. A fluorescent lamp comprising a vaccum-tight sealed glass lamp envelope in which two electrodes connected to current supply wires are provided for producing a discharge during operation of the lamp, the lamp envelope being filled with a gas atmosphere and a metal which during operation of the lamp, at least partly, evaporates and a layer comprising at least one phosphor provided on the inside of the wall of the lamp envelope, characterized in that the lamp envelope is manufactured from a glass consisting of 40–50 mol. % SiO_2, 3–6 mol. % B_2O_3; 0–5 mol. % PbO; 1–3 mol. % Li_2O; 0–2 mol. % Na_2O; 1–7 mole. % K_2O; 5–15 mol. % CaO; 0–10 mol. % MgO; 5–30 mol. % BaO; 0.0.5 mol. % CeO_2;3–6 mol. % ZrO_2 and 3–6 mol. % Al_2O_3, the sum of the quantities of ZrO_2 and Al_2O_3 being 5–10 mol. %, the sum of the quantities of the alkali metal oxides being 4–10 mol. % and the sum of the quantity of

PbO and the total quantity of the alkaline earth metal oxides including MgO, being 27–37 mol. %.

4,684,848

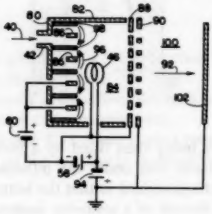
BROAD-BEAM ELECTRON SOURCE

Harold R. Kaufman, and Raymond S. Robinson, both of Fort Collins, Colo., assignors to Kaufman & Robinson, Inc., Fort Collins, Colo.

Continuation of Ser. No. 535,730, Sep. 26, 1983, abandoned. This application Oct. 15, 1985, Ser. No. 787,665

Int. Cl.⁴ H01J *7/24;* H05B *31/26*

U.S. Cl. 315—111.81 **23 Claims**



1. An electron source comprising:

a chamber;

means for introducing an ionizable gas into said chamber;

means for developing a plasma throughout a region within said chamber and the size of which region is large compared to the Debye length in said plasma;

and a selective means constituting a bounding wall of said chamber effectively defining a screen with an array of apertures transmissive of electrons produced from said plasma together with means, including the impressing of a potential on said screen, to enable broad extraction from said chamber of a defined broad beam of said produced electrons, while screening flow of ions from within said chamber, said selective means accelerating an effective plurality of electron beamlets which exhibit balanced electron-emissive characteristics that coalesce into a defined beam.

17. A method of developing a broad beam of electrons which comprises:

introducing an ionizable gas within a confined space;

creating ionization of said gas to produce a plasma that yields a copious supply of electrons along with positive ions, said plasma being created throughout a region the size of which is large compared to the Debye length in said plasma;

and extracting said electrons from said plasma as an effective plurality of beamlets of uniform electron-emission characteristics and which together define a broad-area beam thereof and directing said beam toward a target.

4,684,849

METHOD FOR DRIVING A GAS DISCHARGE DISPLAY PANEL

Akira Otsuka, Zama; Tsutae Shinoda, Akashi; Kenji Horio, Kawasaki, and Tsuyoshi Tanioka, Musashino, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Apr. 17, 1985, Ser. No. 724,276

Claims priority, application Japan, Apr. 18, 1984, 59-076527

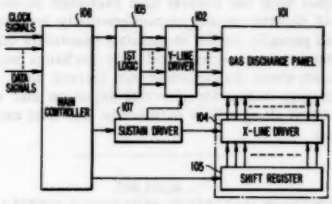
Int. Cl.⁴ G09G *3/10, 3/22*

U.S. Cl. 315—169.4 **21 Claims**

1. A method for driving a gas discharge display panel having first and second arrays of parallel electrodes disposed on opposite sides of said panel and covered by corresponding first and second layers of dielectric material with a discharge gap therebetween filled with a discharge gas, said first and second electrode arrays being transversely oriented and the coordinate intersections thereof defining individual discharge cells, comprising:

applying a write signal of a first peak voltage level sufficient to produce a discharge in a cell, to at least a selected one of said electrodes of said first array, for producing a discharge in each of the cells associated with said selected, first array electrode;

applying an erase signal to said selected, first array electrode, following the application of said write signal thereto , the erase signal being of a second peak voltage level capable of terminating the said discharges in the said cells associated with said first array electrode;



applying selectively and simultaneously, and in time coincidence with the application of the erase signal to said selected first array electrode, an erase signal cancelling pulse to each of said electrodes of said second array corresponding to cells associated with said selected first array electrode in which a discharge is to be maintained, the voltage level of said cancelling pulse being substantially less than said second voltage level but sufficient to inhibit termination of discharges by the erase signal; and

applying sustain signals to all of said cells thereby to maintain said discharges in said selected cells.

4,684,850

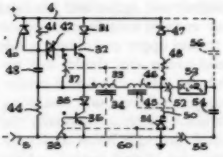
VARIABLE FREQUENCY BRIDGE INVERTER FOR DRIVING GAS DISCHARGE LAMPS

Carlile R. Stevens, 468 El Rio Rd., Danville, Calif. 94526

Filed Sep. 23, 1985, Ser. No. 778,922

Int. Cl.⁴ H05B *37/02*

U.S. Cl. 315—209 R **12 Claims**



1. A source of DC voltage;

a first transistor and a first diode connected in series such that said voltage source is applied to the collector of said first transistor through said first diode which is forward biased to conduct current through said first diode at the same time it is passing through said first transistor;

a second transistor and a second diode with said second diode connected to said second transistor in the same manner as said first diode and said first transistor, the emitter of said second transistor being connected to the common of said voltage supply the electrode of said second diode not connected to said second transistor being connected to the emitter of said first transistor the entire

combination comprising four elements in series between said voltage source and said voltage source common;

a first transformer the primary winding of which is connected to the emitter of said first transistor;

a second transformer the primary winding of which is connected in series with the primary winding of said first transformer, the other end of said primary winding being connected to a load to receive the alternating current and voltage provided by the alternate switching on and off of said first and second transistors;

a first secondary on said first transformer connected between the base and emitter of said first transistor and polarized such that current flowing through said first transistor and the primary of said first transformer to the load will drive said first secondary in such a manner as to provide base current to said first transistor;

a first secondary of said second transformer connected between the base and the emitter of said second transistor polarized in such a manner as to provide drive current to said second transistor when current is flowing from the load through said primary of said second and first transformers, said second diode and said second transistor collector and emitter junction the turns ratio maintained between said first transformer's primary and first secondary, and said second transformer's primary and first secondary to be maintained equal to the minimum gain of said first and second transistors;

one or more first capacitors connected to the other end of said load and the common line of said DC power source, to the DC power source itself, or both, the capacitive reactance thus established eliminating any direct current component flowing in said load;

a second secondary on said first transformer and a third secondary on said second transformer, the same end of each connected together and connected to a capacitor whose other end is connected to the common of said voltage supply, third and fourth transistors the collectors of each connected to one of the other ends of the said second secondaries;

a second and fourth diode each connected across said third and fourth transistors between collector and emitter polarized to conduct current in the opposite direction that current is conducted when said third and fourth transistors are in the on state;

said second secondaries of said first and second transformers being polarized to force said first and second transistors off when said third and fourth transistors are in the on conducting condition;

a variable frequency oscillator with two outputs, one output connected to drive said third transistor, the second output connected to drive said fourth transistor. Each output causing the on conduction of its appropriate third or fourth transistor, at the beginning of each half cycle alternately for a predetermined time period;

a method to adjust the frequency of said variable frequency oscillators.

4,684,851

DC/AC CONVERTER FOR FEEDING A METAL VAPOR DISCHARGE TUBE

Johannes M. Van Meurs, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

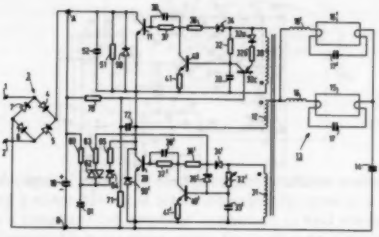
Filed Jul. 18, 1985, Ser. No. 756,412

Claims priority, application Netherlands, Jul. 26, 1984, 8402351

Int. Cl.[4] H05B *41/24*

U.S. Cl. 315—224 **11 Claims**

1. A DC/AC converter for energizing a discharge tube comprising: two input terminals connected to a first series-combination of a first transistor, a load circuit comprising-in the operating condition—the discharge tube, a primary winding of a transformer and a first capacitor, the load circuit together with the transformer primary winding and the first capacitor being shunted by a second transistor, a first secondary winding of the transformer forming part of a control circuit for the first transistor, a second secondary winding of the transformer forming part of a control circuit for the second transistor, a combination of an auxiliary capacitor, an auxiliary transistor and a first timing circuit provided to equalize the conduction times of the first and the second transistor, a main electrode of the auxiliary transistor being connected to a junction between the first transistor and the second transistor, characterized in that the first and the second secondary windings of the transformer interconnect the base and a main electrode of the relevant first and second transistors, respectively, means connecting the input terminals to a voltage divider having a tapping connected via the auxiliary capacitor to the junction between the first transistor and the second transistor and to the base of the auxiliary transistor, and means connecting the main electrode circuit of the auxiliary transistor parallel to a part of the first timing circuit which is included in the control circuit of one of the two transistors.



4,684,852

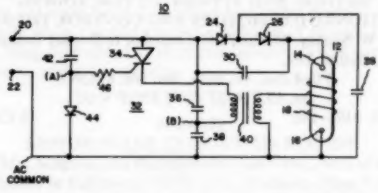
FLASH LAMP CIRCUIT

Francis Balogh, Niagara Falls, Canada, assignor to Star Headlight & Lantern Company, Inc., Honeoye Falls, N.Y.

Continuation of Ser. No. 422,520, Sep. 24, 1982, abandoned. This application Mar. 1, 1985, Ser. No. 707,350

Int. Cl.[4] H05B *37/00, 39/00, 41/14*

U.S. Cl. 315—241 R **20 Claims**



1. A circuit for firing a flash lamp from AC power lines having a peak voltage less than the ionization voltage for initial arc conduction of said lamp when said lamp is fired which comprises means connected across the AC lines and across said lamp for storing energy for less than the period of a cycle of the AC voltage from said lines at a voltage higher than said ionization voltage for initial arc conduction and means included in said means connected across said lines for providing a direct path for current flow through said lamp from said lines continuously during said initial arc conduction and for sustaining arc conduction, said storing means consisting of the only energy storing means in the circuit for developing said ionization voltage for arc conduction of said lamp which are connected to said lamp, and means included in said storing means directly connecting said lamp across said lines to enable current flow from said lines through said lamp during ionization when said lamp fires, and means also connected to the AC lines and to said lamp for applying a trigger pulse to fire said lamp at or near the point during the said cycle when said peak voltage is reached and to enable current flow to said lamp from the AC lines.

4,684,853

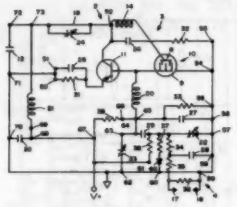
GARAGE DOOR OPENER USING TRANSMITTER WITH SAW OSCILLATOR MODULATOR

Ronald J. Coash, Lincoln, Nebr., assignor to Emhart Industries, Inc., Indianapolis, Ind.

Continuation of Ser. No. 765,279, Aug. 13, 1985, abandoned. This application Jul. 25, 1986, Ser. No. 889,589

Int. Cl.[4] H04Q *7/02*

U.S. Cl. 318—16 **9 Claims**



1. A garage door opener system comprising:

a means for mechanically connecting to a garage door;

a motor for driving said means for connecting;

a manually operable switch;

means responsive to said switch for producing a transmitter input signal,

a transmitter responsive to said transmitter input signal for producing an r-f output signal, said transmitter comprising an electric oscillator circuit means for producing said r-f output signal, a surface acoustic wave device connected within said oscillator circuit means for stabilizing oscillation of said r-f output signal, and means for modulating the oscillation frequency of said oscillator circuit means;

a receiver for receiving said r-f output signal and for producing a controller input signal;

a controller means responsive to said controller input signal for providing power to said motor.

4,684,854

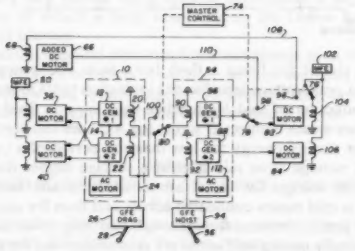
METHOD AND APPARATUS FOR ADDING ADDITIONAL D.C. MOTORS AND CONTROL THEREOF

Edwin W. Sankey, Marion, Ohio, assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jun. 16, 1986, Ser. No. 874,941

Int. Cl.[4] H02J *4/00;* **H02P** *9/00*

U.S. Cl. 318—140 **18 Claims**



1. In apparatus having a material handling device moveable in at least first and second motions and having a first motor generator set for providing electrical power to cause said at least first motion, a second motor generator set for providing electrical power to cause said at least second motion, each of said motors and generators having field excitation windings provided with electrical current, and a first and a second motion control means coupled to respective generator field excitation windings for varying the current therethrough to control the power to said respective first and second motions, the improvement comprising:

a. a standby electrical drive motor on said apparatus for providing additional power for said first motion, and

b. means coupled to said first and second motion control means and said second motor generator set for selectively coupling either all or only a portion of said electrical power from said second motor generator set to said standby electrical drive motor thereby increasing the power to said first motion and decreasing the power to said second motion.

9. Apparatus for controlling electrical power generators and motors for each of at least first and second motions of a material handling device comprising:

a. means coupled to one of said generators for detecting when one of said motions is requiring no more than a predetermined minimum amount of available electrical power, and

b. means coupled to said detecting means and said motor for said other motion for utilizing the balance of said available electrical power of said one generator for said one motion to increase the electrical power available to said motor for said other motion thereby increasing the electrical power available for said other motion without adding additional power sources.

18. A method of controlling electrical power to apparatus causing first and second motions of a material handling device comprising the steps of:

a. detecting when one of said motion causing apparatus is requiring no more than a predetermined minimum amount of available electrical power, and

b. utilizing the balance of said electrical power available for said one motion causing apparatus to increase the electrical power available to said other motion causing apparatus thereby increasing the electrical power available for said other motion without adding additional power sources.

4,684,855

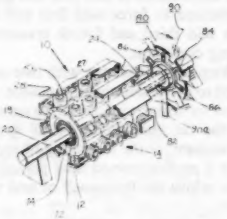
PERMANENT MAGNET DIRECT CURRENT MOTOR APPARATUS

Joseph Kallos, 195 Eaton St., Bridgeport, Conn. 06600

Continuation-in-part of Ser. No. 588,352, Mar. 12, 1984, abandoned. This application Oct. 7, 1985, Ser. No. 785,265

Int. Cl.[4] H02K *23/00*

U.S. Cl. 318—254 **7 Claims**



1. A permanent magnet d.c. motor apparatus comprising:

A. rotor means having a homogeneous core surrounding a longitudinal axis upon which is mounted an outer, segmented ring formed of a plurality of alternating polarized groups of magnets, such that any first group of magnets of a polarized group and other polarized groups of magnets has an end magnet juxtaposed to an end magnet of a second group of magnets of said polarized groups of magnets for providing a plurality of spatially distributed, localized magnetic flux about the outer circumference of said outer segmented ring;

B. stator means having a plurality of cylindrically spaced rows of electrically conductive coils which are radially disposed outside of said rotor means for electromagnetic coupling to said spatially distributed, localized magnetic flux about said rotor circumference of said outer segmented rings;

C. timing means for providing a periodic timing pulse in response to rotation of said rotor, and;

D. electronic control means responsive to said periodic timing pulse for providing a sequential flow of current to said conductive coils, whereupon said current is directly proportional to a generation of said periodic timing pulses during one revolution of said rotor;

wherein said timing means is mounted for rotation with said rotor comprising;

a circular disk with a plurality of radially disposed electrical contacts mounted thereon;

a plurality of fixed contacts which contact said radially disposed electrical contacts as the disk rotates;

a d.c. electrical potential connected to said radially disposed electrical contacts;

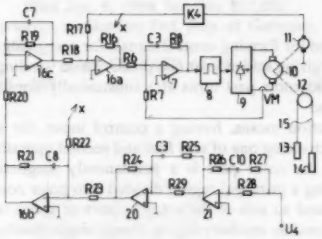
a timing pulse conductor between said radially disposed electrical contacts and said electronic control means, said conductor providing an electrical path to communicate periodic timing pulses.

4,684,856

METHOD AND DRIVE FOR ELEVATOR DC DRIVE MOTOR STABILIZATION

Matti Kahkipuro, Hyvinkaa, Finland, assignor to Elevator GmbH, Baar, Switzerland

Filed Aug. 6, 1984, Ser. No. 637,870
Claims priority, application Finland, Aug. 17, 1983, 832946
Int. Cl.[4] H02P *7/06*; B66C *13/30*
U.S. Cl. 318—310 **1 Claim**



1. An elevator speed control stablization system for a DC motor in which speed control current signal and speed signal are used as feedback informatio.i, said system comprises:

a first and second stablization circuit in circuit relation with respect to one another being in series in a control signal circuit for compensation of three time constants in a speed control loop, practically delay free compliance with respect to speed control signals;

said control signal originating at the input to said first stabilization circuit and said second speed control signal originating at the input to said second stablization circuit;

said stablization circuit having phase compensation, so that the output of said stablization circuit has a capacitive lead of phase as compared to the input of said stablization circuit; each of said stabilization circuits have operational amplifiers and said first stabilization circuit being able to compensate one time constant, said time constant being a parallel coupling network of resistance and capacitance in circuit with said operational amplifiers;

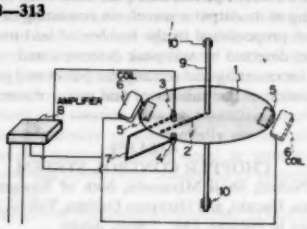
and said second stablization circuit being able to compensate two time constants with the aid of a stabilization circuit, said time constants being a series coupling of resistance and capacitance in circuit with said operational amplifiers; and a portion of the speed control signal is fed to the output of said second stabilization circuit and the output signal of said second stabilization circuit is fed to an additional operational amplifier as the output of said second stabilization circuit, to isolate the stabilization circuits from an ignition circuit firing motor drive thyristors of said DC drive motor.

4,684,857

OPTICAL EXCITATION ELECTROMAGNETIC MOTOR

Miguel C. Llopis, C/Dolores Piera, 5 - Benisa (Alicante), Spain

Filed Jan. 14, 1985, Ser. No. 691,449
Claims priority, application Spain, Jan. 24, 1984, 529123
Int. Cl.[4] H02K *29/00*
U.S. Cl. 318—313 **5 Claims**



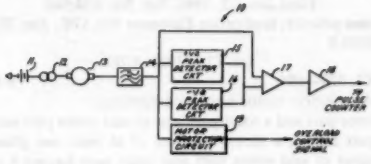
1. An optical excitation electromagnet brushless motor comprising a stator having at least two angularly separated stator coils; a transistorized amplifier connected to said stator coils and connectable to a power source for exciting said stator coils when said amplifier is activated; a rotor rotatably mounted about an axis with respect to said stator and carrying at least two angularly spaced rotor magnets each for generating a permanent magnetic field for interaction with magnetic fields generated by said stator coils when energized by said amplifier to cause rotation of said rotor about said axis, a disc mounted for rotation with said rotor and having a radially extending port therein extending radially on said disc with respect to said axis and rotatable about said axis, said port being at a selected angular position with respect to said rotor magnets; an arm mounted for radial movement with respect to said disc, to any radial location along the radial extent of said port; a light transmitter and a light receiver mounted on said arm on opposite sides of said disc for the passage of light from said transmitter to said receiver through said port when said port passes between said light transmitter and light receiver, said light receiver being connected to said transistorized amplifier for energizing said transistorized amplifier when receiving light from said light transmitter through said port, a speed of rotation of said rotor being determined by a radial position of said arm with respect to said axis and a direction of rotation of said rotor being determined by an angular position of said port with respect to said rotor magnets.

4,684,858

MOTOR PULSE EXTRACTION SYSTEM

John Ma, Milpitas, and Steven Weiss, Las Gatos, both of Calif., assignors to Capetronic (BSR) Ltd., Kowloon, Hong Kong

Filed Sep. 3, 1985, Ser. No. 771,667
Int. Cl.[4] H02P *5/06*
U.S. Cl. 318—317 **22 Claims**



1. A motor pulse extraction system for measuring the rotational motion of an electric motor, said system comprising:

a fixed voltage source supplying said motor,

means for sensing the variations in the form of pulses in the current within said motor due to the pulses resulting from the commutation undergone by said motor;

filtering means capable of suppressing the high frequency noise produced within said motor during commutation

and allowing only said pulses in motor current to pass through,

peak following circuitry including a positive peak detector for following the positive peaks of said current pulses and a negative peak detector for following the negative peaks of said current pulses, said peak following circuitry producing at its output a waveform consisting of rectangular pulses proportional to the number of said motor current pulses detected by said peak detectors, and

means for counting said rectangular pulses and generating an indication of the number of said motor current pulses.

4,684,859

CHOPPER CONTROL SYSTEM

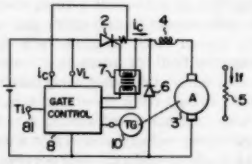
Makoto Nohmi; Shoji Miyamoto, both of Kawasaki; Tadashi Takaoka, Ibaraki, and Hiroyasu Oshima, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 17, 1985, Ser. No. 692,114

Claims priority, application Japan, Nov. 16, 1984, 59-240641

Int. Cl.[4] H02P *13/26, 5/16*

U.S. Cl. 318—317 **8 Claims**



1. A chopper control system for controlling the operation of a motor unit comprising:

a chopper apparatus for chopping power source voltage so as to produce a chopper power required to drive said motor unit;

means for periodically repeating calculation of an integrated value of the chopper power which varies in proportion to a chopper current applied to said motor unit through said chopper apparatus during the conduction period of the chopper apparatus; and

means for periodically turning-on said chopper apparatus and for turning-off said chopper apparatus when said integrated value reaches a predetermined value.

4,684,860

ELECTRIC MOTOR DRIVE EQUIPPED WITH A PERMANENTLY MAGNETIZED ROTOR

Marc A. Heyraud, and Jean-Bernard Kureth, both of La Chaux-de-Fonds, Switzerland, assignors to Asgalium S.A., Switzerland

Filed Jan. 23, 1986, Ser. No. 824,546

Claims priority, application European Pat. Off., Jan. 29, 1985, 85810030.8

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **6 Claims**

1. An electric motor circuit comprising:

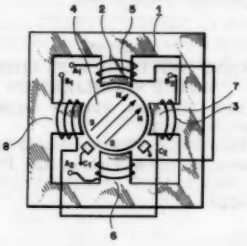
a stator part and a rotor part, one of said stator part and rotor part having a motor winding of at least one phase, the other of said stator part and rotor part having a permanently magnetized magnetic element with at least one pair of magnetic poles;

a drive device comprising:

clock signal generating means;

orientation signal generating means for indicating the orientation of said rotor part at successive instants, said orientation signal generating means comprising at least one sensor having a predetermined location fixed relative to said winding and being sensitive to variations of a magnetic field generated by said magnetic element at said location;

control means, connected to said clock signal generating means and said orientation signal generating means, for selectively controlling the energization and deenergization of said at least one phase of said winding in a first and a second operating mode, wherein in said first operating mode said at least one phase is periodically energized and deenergized in response to successive clock signals from said clock signal generating means, and in said second mode said at least one phase is energized and deenergized in response to successive orientation signal from said orientation signal generating means, said control means further comprising means for processing signals emitted by said at least one sensor



and for forming control signals for energizing and deenergizing said at least one phase of said winding whereby said rotor part turns at a substantially constant speed; and

selection means, having a control input, for selectively activating one of said first and second operating modes;

wherein the rotor part is a permanently magnetized rotor comprising a principal region divided into polar zones distributed around an axis of the rotor in pairs of zones of opposite polarity, and an auxiliary region comprising a number of auxiliary polar zones said number being a multiple of that of the principal polar zones, a predetermined number of auxiliary polar zones being allotted to each main polar zone, and wherein the orientation signal generating means being disposed in such a way as to cooperate with the said auxiliary polar zones.

4,684,861

INTERFACE UNIT BETWEEN A NUMERICAL CONTROLLER AND AN ELECTRIC POWER CONTROL CIRCUIT

Hideaki Kawamura, Hachioji, and Toshiaki Otsuki, Hino, both of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP85/00251, § 371 Date Dec. 20, 1985, § 102(e) Date Dec. 20, 1985, PCT Pub. No. WO85/05199, PCT Pub. Date Nov. 21, 1985

PCT Filed May 1, 1985, Ser. No. 822,429

Claims priority, application Japan, May 2, 1984, 59-88906

Int. Cl.[4] G05B *19/00*

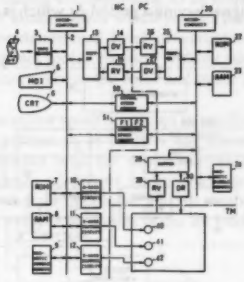
U.S. Cl. 318—567 **1 Claim**

1. An interface unit for connection between a numerical controller and an electric power control circuit, comprising:

an actual speed memory, coupled to the numerical controller and the electric power control circuit, into which the numerical controller can write actual speed data and from which the electric power control circuit can read out the written actual speed data; and

a corrected speed memory, coupled to the numerical con-

troller and the electric power control circuit, into which the electric power control circuit can write corrected



speed data and from which the numerical controller can read out the written corrected speed data.

4,684,862

CONTROL APPARATUS FOR A MULTIPLE-AXIS MACHINE TOOL

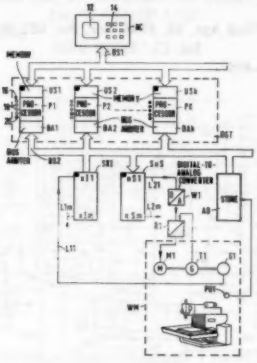
Josef Röhrle, Hessdorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jan. 8, 1986, Ser. No. 817,030

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1985, 3501968

Int. Cl.[4] G05B *19/10*

U.S. Cl. 318—568 **18 Claims**



1. A control apparatus for a multi-axis machine tool having a plurality of movable components each shiftable by a respective linear drive along a respective translation axis or rotatable by a respective rotary drive about a respective rotation axis, said control apparatus comprising:

numerical control means for supplying, in accordance with predetermined parts programs, electrically encoded reference positions for the movable components along the translation axes and about the rotation axes;

memory means, including a plurality of transfer memories operatively connected to said numerical control means, for receiving therefrom and temporarily memorizing said electrically encoded reference positions;

pick-up means for sensing actual positions of the movable components along the translation axes and about the rotation axes and for generating electrical signals encoding the sensed actual positions;

storage means operatively connected to said pick-up means for receiving therefrom and temporarily storing said electrical signals;

position control means operatively connectable to said numerical control means via said memory means and to said storage means for generating, in response to said reference positions received from said numerical control means via said memory means, in response to the actual positions encoded in said electrical signals and in accordance with predetermined motion parameters, control signals for modifying rates of linear motion of said components along said translation axes and rates of rotation of said components about said rotation axes, said position control means including a plurality of substantially similar processors, said transfer memories being equal in number to said processors and operatively connected to respective ones thereof; and

coupling means for operatively connecting to said numerical control means and to said storage means a variable number of said processors equal at most to the total number of said translation axes and said rotation axes and for enabling detection by said numerical control means of the number of processors connected by said coupling means and for further enabling communication, to each one of the connected processors by said numerical control means, of the identity of each of said components and said axes to be controlled by said one of the connected processors, said storage means being accessible in its entirety by each of the connected processors.

4,684,863

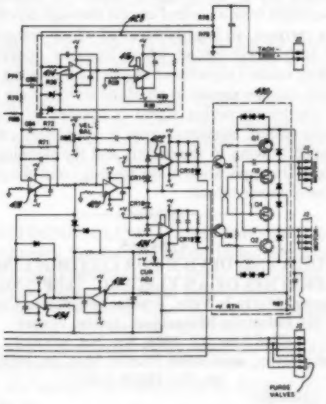
SEMICONDUCTOR WAFER BOAT LOADER CONTROL SYSTEM

Robert E. Aldridge, Anaheim; Russell Elloway, Riverside; William O. Fritz, Anaheim; Ralph D. Goff, and Michael J. Herrera, both of Placentia, all of Calif., assignors to Thermco Systems, Inc., Orange, Calif.

Division of Ser. No. 719,409, Apr. 3, 1985, Pat. No. 4,636,140. This application Jun. 30, 1986, Ser. No. 880,423

Int. Cl.[4] G05B *11/28*

U.S. Cl. 318—599 **10 Claims**



1. For use with apparatus for loading articles into a furnace chamber and of the type including a carriage for transporting the articles, means for guiding the movement of the carriage along a path toward and away from the chamber, and an electrical motor for driving the carriage, a control system for controlling the movement of said carriage along said path, said control system comprising:

first means for generating a first electrical signal corresponding to a desired velocity of said carriage;

second means for generating a second electrical signal corresponding to the speed of said motor;

third means for combining said first and second electrical signals to produce a velocity error signal;

fourth means responsive to said second means for supplying an alternating electrical signal;

fifth means for modulating said alternating signal using said velocity error signal to produce a series of positive and negative pulses, the widths of said pulses being proportional to said error signal; and

sixth means responsive to said pulses for driving said motor and for correcting the speed of said motor, such that said carriage moves along said path at said desired velocity.

4,684,864

DRIVING CIRCUIT OF STEPPING MOTOR FOR FLOPPY DISK DRIVE

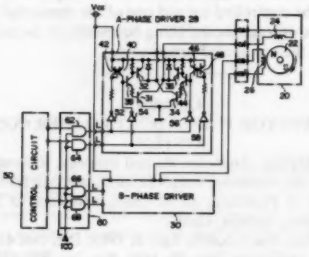
Atsutaka Morimoto, Kanagawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Mar. 20, 1986, Ser. No. 841,548

Claims priority, application Japan, Mar. 25, 1985, 60-060113

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **4 Claims**



1. In a driving circuit of a stepping motor for a floppy disk drive which drives the stepping motor by feeding control signals supplied from a control circuit through drivers in order to feed a carriage, an improvement of which comprises:

an all zero power circuit which logically operates on the feeding control signals and an electricity saving signal and which outputs signals to all of the drivers such that when the electricity saving signal is applied to the all zero power circuit, electric current is completely cut off to be stopped flowing to the drivers and the stepping motor in spite of the application of the feeding control signals to the all zero power circuit.

4,684,865

METHOD AND DEVICE FOR CONTROLLING THE ACCELERATION OF AN ELECTRIC STEPPING MOTOR

Marc Auger, Marly la Ville, France, assignor to Centre Technique des Industries Mecaniques, Senlis, France

Filed Mar. 21, 1986, Ser. No. 842,810

Claims priority, application France, Mar. 25, 1985, 85 04373

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **12 Claims**

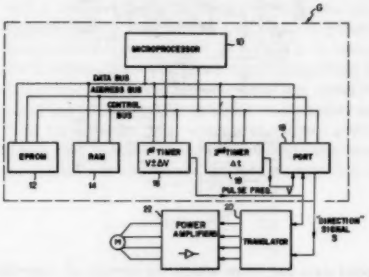
1. A method for controlling the acceleration of an electric stepping motor between a starting speed V_o and a maximum value V_m in incremental increases ΔV_n of the motor control pulse frequency, wherein said method comprises the steps of:

dividing the acceleration time into a predetermined number of equal periods Δt each representing a fraction of said acceleration time;

computing beforehand by means of a microprocessor all the speed values $(V_{n-1}+\Delta V_n)$ corresponding to each period Δt, ΔV_n is smaller than the increase ΔV_{n-1} of the immediately proceeding period Δt during at least the final portion of the acceleration phase;

storing in a RAM memory data representative of values which have thus been precomputed;

producing a signal having a period Δt which is applied to the



microprocessor so that the precomputed values $(V_{n-1}+\Delta V_n)$ stored in memory should be read successively by said microprocessor at each interval Δt; and

transmitting during each period said values $(V_{n-1}+\Delta V_n)$ in the form of a pulse frequency to the system for controlling the motor windings.

4,684,866

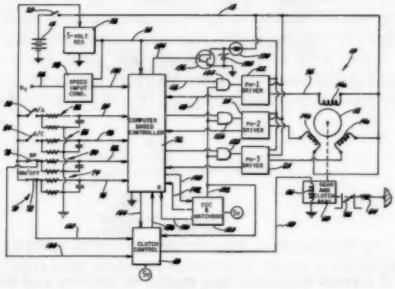
ADAPTIVE CONTROLLER FOR A MOTOR VEHICLE ENGINE THROTTLE OPERATOR

Carl A. Nehmer, Grand Blanc, and Lary R. Hocken, Flint, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 16, 1986, Ser. No. 852,762

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **10 Claims**



1. An electrical servo system for positioning a mechanical load, the system including a stepper motor having a plurality of stator windings adapted to be energized in predetermined sequence to develop a rotating stator magnetic field, a permanent magnet rotor drivingly connected to the load and having a magnetic field which tends to rotate in synchronism with the stator magnetic field, and a controller for sequentially energizing the motor stator windings at a rate determined in accordance with a motor speed command to rotatably drive the rotor for positioning the load in accordance with a position command, a method of operation comprising the steps of:

initializing the motor speed command to a predetermined starting rate at the initiation of motor operation; and thereafter during the energization of each phase winding,

detecting a crossing of the back-EMF voltage in the stepper motor phase winding about to be energized, the point at which such crossing occurs being related to the degree of

misalignment between the magnetic fields of the rotor and stator;

determining a motor speed correction in relation to the amount by which the detected crossing deviates from a desired crossing corresponding to an empirically derived amount of misalignment which permits the motor to withstand a predetermined level of variation in the torque which opposes motor rotation without substantial loss of synchronism between the rotor and stator magnetic fields; and

adjusting the motor speed command in relation to said motor speed correction so as to drive the actual crossing into correspondence with the desired crossing, whereby the motor speed is adaptively controlled in accordance with the torque it must overcome, and the motor speed is maximized for reliable operation under all load conditions.

4,684,867

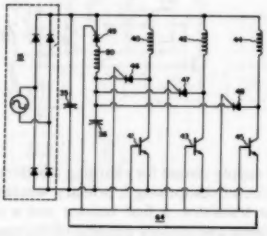
REGENERATIVE UNIPOLAR CONVERTER FOR SWITCHED RELUCTANCE MOTORS USING ONE MAIN SWITCHING DEVICE PER PHASE

Timothy J. E. Miller, Schenectady, N.Y.; Allan B. Plunkett, Portland, Oreg., and Robert L. Steigerwald, Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 31, 1984, Ser. No. 615,655

Int. Cl.[4] H02P *5/40*

U.S. Cl. 318—701 **10 Claims**



1. A converter for a phase winding of a variable reluctance drive, said winding having a first side for connecting to the positive terminal of a dc source, said converter comprising:

a phase switch for coupling a second side of said phase winding to the negative terminal of said dc source when said phase switch is conducting;

a phase unidirectional conducting device having its anode coupled to said second side of said phase winding so as to carry freewheeling current from said phase winding after said phase switch turns off;

a capacitor having one side coupled to the cathode of said phase unidirectional conducting device, said capacitor adapted to be charged by said freewheeling current to a voltage in excess of the dc source voltage; and

bleed means coupling said one side of said capacitor to said positive terminal of said dc source for bleeding at least a portion of the charge on said capacitor back to said positive terminal when the voltage across said capacitor rises to a predetermined value.

4,684,868

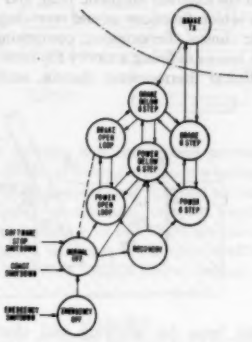
INDUCTION MOTOR CONTROL APPARATUS AND METHOD FOR RESTART WHEN ROTATING IN SHUTDOWN

Habib Dadpey, Atlanta, Ga., and David J. Shero, South Park Township, Allegheny County, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 30, 1985, Ser. No. 793,045

Int. Cl.[4] H02P *5/34*

U.S. Cl. 318—802 **13 Claims**



2. In apparatus for controlling an induction motor in response to an operation request signal, with said motor adapted to be energized from an inverter coupled to a DC power source having a voltage and, after the inverter has been shut down with the motor rotating, the combination of

first means coupled with the motor to provide a motor speed signal,

second means responsive to the motor speed signal for providing a desired inverter frequency signal in relation to said motor speed signal,

third means determining a desired inverter voltage in response to the motor speed signal,

fourth means determining a predetermined percent of said desired inverter voltage for providing voltage to said motor,

fifth means coupled with the fourth means for providing a predetermined ramp increase of the motor voltage provided for said motor, and

means responsive to said motor voltage for providing a recovery start-up of the inverter when said motor voltage goes to substantially zero and the operation request signal is requesting a motor torque.

4,684,869

ELECTRONIC CLINICAL THERMOMETER

Susumu Kobayashi; Yutaka Muramoto; Hideo Ishizaka, all of Fujinomiya, and Yoshinori Ishii, Yamato, all of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 475,858, Mar. 16, 1983. This application Sep. 10, 1985, Ser. No. 774,311

Claims priority, application Japan, Mar. 24, 1982, 57-45630; Mar. 24, 1982, 57-45631

Int. Cl.[4] G01K *5/00;* **H01M** *10/46;* **H02J** *7/00*

U.S. Cl. 320—2 **11 Claims**

1. A combination of an electronic clinical thermometer and a charger,

the electronic clinical thermometer comprising:

(a) a circuit for measuring and displaying the temperature of a portion being measured;

(b) a secondary battery for supplying electric power to said circuit;

(c) rectifier means connected to said secondary battery;

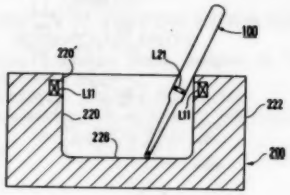
(d) a power receiving coil connected to said rectifier means

for inducing a voltage in response to a change in an external magnetic field applied to said power receiving coil; and

(e) a hollow elongated bar-shaped casing housing said circuit, said secondary batter, said rectifier means, and said power receiving coil, said power receiving coil being positioned at an axial position of said casing in the vicinity of a support edge determined by a receiving means, whereby said secondary battery can be charged by voltage induced in said power receiving coil in response to a change in the external magnetic field; and

the charger which functions as said receiving means for the electronic clinical thermometer, comprising:

(a) a casing means defining a cavity for receiving said electronic clinical thermometer therein, said cavity being



sufficiently large for allowing said electronic clinical thermometer accommodated substantially vertically therein to be obliquely inclined;

(b) said casing means defining said supporting edge against which an obliquely inclined electronic clinical thermometer which is accommodated obliquely in said cavity may bear, said supporting edge being substantially in alignment with said power receiving coil of a thermometer accommodated in said cavity of said casing means; and

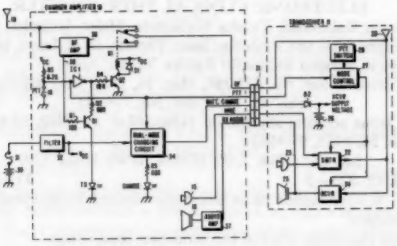
(c) power transmitting coils disposed adjacent to said supporting edge at spaced intervals, whereby mutual inductance with low statistical dispersion can be formed between said power transmitting and receiving coils when said thermometer is accommodated in said container means.

4,684,870

TRANSCEIVER BATTERY CHARGING APPARATUS AND METHOD

David L. George, Indianapolis, and Raymond G. Benson, Jr., Plainfield, both of Ind., assignors to Uniden Corp. of America, Indianapolis, Ind.

Filed Apr. 9, 1986, Ser. No. 849,767
Int. Cl.[4] H02J *7/00*
U.S. Cl. 320—20 **27 Claims**



1. A battery charger for a hand-held transceiver having a rechargeable battery, comprising:

a housing having means for receiving the transceiver;

connector means for electrically connecting said battery charger to the transceiver, said connector means including a microphone terminal, an RF terminal, a mode control terminal and a charger output terminal;

a microphone unit having a microphone and a mode switch, said microphone being electrically coupled to said microphone terminal;

multiwire cable means for attaching said microphone unit to said housing;

an RF amplifier having an input and an output;

an antenna lead connected to said RF amplifier output;

mode control means for correspondingly controlling the operating modes of said battery charger and the transceiver for transmit and receive modes, said mode control means having an input connected to said mode switch and an output connected to said mode control terminal;

means responsive to said mode control means for coupling said RF terminal to said RF amplifier input during transmit mode and to said antenna lead during receive mode; and

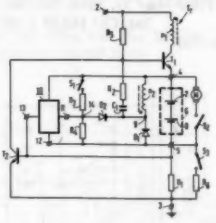
charging circuit means for selectively charging the transceiver battery from a source of a first voltage during transmit mode and from a source of a second, higher voltage during receive mode, said charging circuit means having an output connected to said charger output terminal.

4,684,871

POWER SUPPLY CIRCUIT

Joseph A. M. Plagge, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 28, 1986, Ser. No. 845,659
Claims priority, application Netherlands, Dec. 18, 1985, 8503479
Int. Cl.[4] H02J *7/10*; H02M *3/335*
U.S. Cl. 320—21 **16 Claims**



1. A power supply circuit for charging a battery comprising: a first series circuit comprising a primary winding of a transformer, a first transistor, a first resistor and a second series circuit comprising a secondary winding of the transformer and a first rectifier diode, said second series circuit having connection terminals for connection to the battery, a positive feedback network including a first capacitor connected between a junction of the secondary winding and the first rectifier diode and a base of the first transistor, a second transistor coupled to the first resistor and the first transistor for turning off the first transistor, a switching amplifier coupled between the connection terminals for the battery for turning on the second transistor above a first value of the battery voltage and for turning off the second transistor below a second value of the battery voltage, the second battery voltage value being less than the first value, said switching amplifier having a first input, a second input and an output, means coupling said first input to a tap on a voltage divider, a switch coupling the voltage divider between the connection terminals for the battery during periods when the first transistor is turned off, means coupling said second input to the connection terminal of the battery facing the first rectifier diode, means coupling said switching amplifier output to a base of the second transistor, and means coupling the first input of the switching amplifier by means of a second rectifier diode to the junction of the secondary wind-

ing and the first rectifier diode with the forward direction of the second rectifier diode, as seen from said junction, being the same as that of the first rectifier diode.

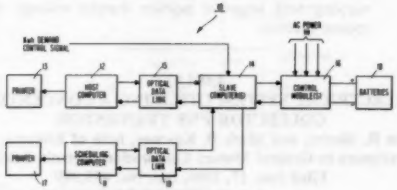
16. A shaver comprising: a motor connected via a switching device to a pair of connection terminals for a battery, and a power supply circuit coupled to the connection terminals for charging a battery when connected to the connection terminals, said power supply circuit comprising, a first series circuit including a primary winding of a transformer, a first transistor, said pair of connection terminals and a first resistor, a second series circuit including a secondary winding of the transformer and a first diode coupled to the connection terminals, a positive feedback network including a first capacitor connected between a junction of the secondary winding and the first diode and a base of the first transistor, a second transistor coupled to the first resistor and to the first transistor for turning off the first transistor, a switching amplifier coupled to the connection terminals for turning on the second transistor above a first value of the battery voltage and for turning off the second transistor below a second lower value of the battery voltage, a switch coupling a first input of the switching amplifier to a first of said connection terminals during periods when the first transistor is turned off, means coupling an output of the switching amplifier to a base of the second transistor to turn the second transistor on and off at the first and second values, respectively, of the battery voltage, and a second diode coupling said first input of the switching amplifier to the junction of the secondary winding and the first diode with the first and second diodes polarized in the same direction relative to said junction.

4,684,872

BATTERY FORMATION CHARGING APPARATUS

Jim L. Stewart, Leesport, Pa., assignor to General Battery Corporation, Reading, Pa.

Filed Nov. 6, 1985, Ser. No. 795,637
Int. Cl.[4] H02J 7/04
U.S. Cl. 320—45 **11 Claims**



1. An apparatus for charging electric storage batteries, said apparatus comprising:

(a) a host computer for providing charging information to and receiving status information from at least one slave computer by means of a data link; and

(b) at least one control module coupled to said slave computer for applying charging current to at least one electric storage battery in response to instructions received from said slave computer, and for providing feedback and status information to said slave computer.

4,684,873

HYBRID GENERATING SYSTEM

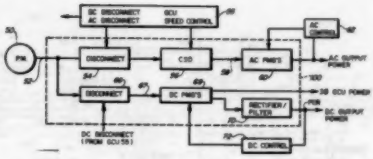
Timothy F. Glennon, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Sep. 25, 1985, Ser. No. 779,995
Int. Cl.[4] H02K 16/00; H02P 9/00
U.S. Cl. 322—47 **14 Claims**

1. A hybrid generating system for generating AC and DC output power from motive power developed by a prime mover, comprising:

an AC power generating section driven by the prime mover for generating the AC output power; and

a DC power generating section independent of the AC power generating section and driven by the prime mover for generating the DC output power, wherein each of the AC and DC power generating sections includes a permanent magnet machine and wherein the AC power generating section includes first and second permanent magnet generators (PMG's) having armature windings connected in series with one another and first and second rotor magnetic structures mechanically coupled together wherein the armature windings of one PMG are movable relative to the armature windings of the other PMG to vary the magnitude of the AC output power voltage.

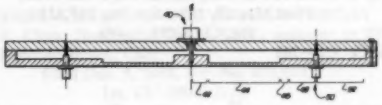


4,684,874

RADIAL WAVE POWER DIVIDER/COMBINER AND RELATED METHOD

Gerald W. Swift, Rolling Hills Estates, and David I. Stones, Torrance, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Feb. 5, 1985, Ser. No. 698,296
Int. Cl.[4] H01P 5/12
U.S. Cl. 333—125 **5 Claims**



1. A broadband radial microwave power divider/combiner, comprising:

a pair of circular, axially spaced waveguide plates having a plurality of adjoining circumferentially-continuous, annular-shaped radial waveguide sections, each of which has a parallel walls formed by the two waveguide plates and has a radial length and axial spacing optimally selected to provide a close equivalent of a desired lumped circuit element;

a central point located at the center of the plates; and

a plurality of peripheral ports iniformly spaced about a circular arc near the periphery of the plates;

wherein the equilvalent-circuit values of the annular-shaped radial waveguide sections combine to provide a radial microwave power divider or combiner having a desired wide passband characteristic over a selected frequency range.

4,684,875

POWER CONDITIONING SYSTEM AND APPARATUS

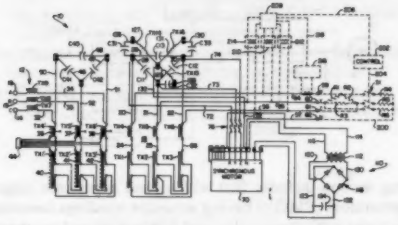
Jeffrey M. Powell, Galena, Ohio, assignor to Liebert Corporation, Columbus, Ohio

Filed Apr. 28, 1986, Ser. No. 856,837
Int. Cl.[4] H02J 3/18
U.S. Cl. 323—204 **21 Claims**

1. Apparatus for use with an a.c. polyphase source of variable voltage level for providing a regulated a.c. output to a load, comprising:

polyphase input choke means connectable with said a.c. source for deriving an energy input substantially immune from variations of waveshape and voltage level;

regulator means for receiving said energy input, including polyphase saturable reactor means and polyphase capacitor means operable therewith to synthesize a polyphase sinusoidal output connectable with said load; and



polyphase motor means having a stator coupled with said output for deriving a stator field, and a rotor, said motor means being controllable to inertially impose a phase shift stability over said sinusoidal output by deriving an inertially driven generator voltage source performance exhibiting phase lag with respect to said a.c. polyphase source in the presence of short duration load transients; and

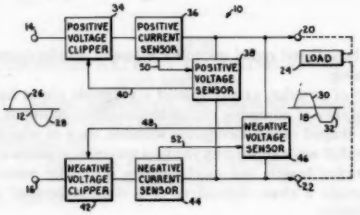
control means for effecting said motor means control for operation continuously at minimum level power input.

4,684,876

VOLTAGE REGULATING DEVICE USING TRANSISTOR MEANS FOR VOLTAGE CLIPPING AND HAVING LOAD CURRENT COMPENSATION

Kirby B. Creel, 506 E. 90th, Kansas City, Mo. 64131

Filed May 27, 1986, Ser. No. 867,131
Int. Cl.[4] G05F *1/445*
U.S. Cl. 323—268 **3 Claims**



1. In an alternating current voltage regulator for use between a source of alternating current input voltage and a load, the regulator including input terminals adapted for coupling with the source and output terminals adapted for coupling with the load, said input voltage including a relatively positive portion and a relatively negative portion, the regulator comprising:

voltage clipping means, operatively coupled with the input terminals and adapted for receiving a control signal, for clipping the maxima of the relatively positive and relatively negative portions of the input voltage at a level corresponding to and in response to said control signal to create an output voltage at a regulated level at the output terminals;

voltage sensing means operatively coupled with the output terminals and with said voltage clipping means for sensing the magnitude of the output voltage and for producing said control signal in response thereto; and

current sensing means coupled in a series relationship with said load for sensing the magnitude of said output current, said current sensing means including means for varying the regulated level of the output voltage in a predetermined, correlated response to variations in the sensed magnitude of said output current,

said voltage clipping means including

positive portion clipping means for clipping the maxima of the positive portion of the input voltage in response to a positive portion control signal to create a regulated positive portion output voltage, and

negative portion clipping means for clipping the maxima of the negative portion of the input voltage in response to a negative portion control signal to create a regulated negative portion output voltage,

said voltage sensing means including

positive portion voltage sensing means for sensing the magnitude of said positive portion output voltage and for producing said positive portion control signal in response thereto, and

negative portion voltage sensing means for sensing the magnitude of said negative portion output voltage and for producing said negative portion control signal in response thereto,

said current sensing means including

positive portion current sensing means for sensing the average magnitude of the positive portion of the output current existing over a predetermined plurality of alternating current cycles, and for providing a correlated positive portion current signal in response thereto, and

negative portion current sensing means for sensing the average magnitude of the negative portion of the output current existing over a predetermined plurality of alternating current cycles, and providing a correl ated negative portion current signal in response thereto,

said positive portion voltage sensing means including means for receiving said positive portion current signal and for varying said positive portion output voltage in response thereto,

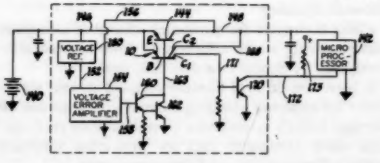
said negative portion sensing means including means for receiving said negative portion current signal and for varying said negative portion output voltage in response thereto.

4,684,877

ELECTRICAL SYSTEM UTILIZING A CONCENTRIC COLLECTOR PNP TRANSISTOR

John R. Shreve, and Mark B. Kearney, both of Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 17, 1986, Ser. No. 875,309
Int. Cl.[4] G05F *1/56*
U.S. Cl. 323—269 **9 Claims**



9. A voltage regulator comprising, a source of direct voltage having positive and negative terminals, an input conductor connected to said positive terminal, an output conductor adapted to be connected to an electrical load, a PNP transistor having its emitter and collector connected between said input conductor and said output conductor, control means connected to the base of said PNP transistor and responsive to the voltage at said output conductor for controlling the conduction of said transistor to PNP maintain the voltage at said output conductor substantially constant and at a magnitude that is lower than the voltage of said voltage source by a first

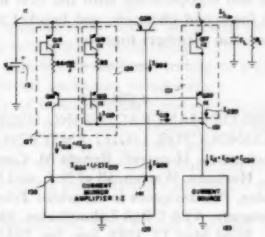
predetermined magnitude, and a lateral PNP transistor having an emitter, an inner collector located adjacent the emitter and an outer collector located outwardly of said inner collector, said lateral PNP transistor operative to develop an output signal at its outer collector when the voltage of its emitter is slightly higher by a second predetermined magnitude than the voltage of its inner collector, said second predetermined magnitude being less than said first predetermined magnitude, means connecting said emitter of said lateral PNP transistor to said input conductor, means connecting said inner collector of said lateral PNP transistor to said output conductor, means connecting said base of said lateral PNP transistor to said control means, said lateral PNP transistor when biased conductive by said control means operative to develop a signal at its outer collector when the input voltage applied to said input conductor drops to a value that is higher than the voltage on said output conductor by said second predetermined magnitude.

4,684,878

TRANSISTOR BASE CURRENT REGULATOR

Raymond L. Giordano, Flemington, N.J., assignor to RCA Corporation, Somerville, N.J.

Filed May 8, 1986, Ser. No. 860,814
Int. Cl.[4] G05F *1/56*
U.S. Cl. 323—279 **10 Claims**



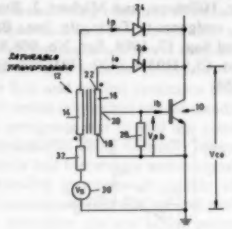
1. The combination comprising:
first and second power terminals for the application therebetween of an input voltage (V_{IN});
an output terminal;
means for the connection of a load means between said output terminal and said second power terminal;
a selectively enabled transistor switch having a collector and an emitter defining the ends of its main conduction path and a base for the application thereto of base drive;
means connecting the collector-to-emitter path of said transistor switch between said first power terminal and said output terminal; and
controllable base drive means coupled between the base of said transistor switch and said second power terminal for supplying base drive to said transistor switch and causing an amplified current to flow between its collector and emitter, said controllable base drive means including sensing means coupled to the emitter and collector of said transistor switch for sensing when the voltage between the collector and the emitter is less than a predetermined value as a result of excessive base drive and for then reducing the base current flowing in the base of said transistor switch.

4,684,879

TRANSISTOR BASE DRIVE CIRCUIT

Gordon L. Bredenkamp, Johannesburg, South Africa, assignor to Crucible, Societe Anonyme, Gerondins, Luxembourg

Filed Jun. 27, 1986, Ser. No. 879,483
Claims priority, application South Africa, Jun. 28, 1985, 85/4899
Int. Cl.[4] G05F *1/46*; H02P *13/18*
U.S. Cl. 323—289 **5 Claims**



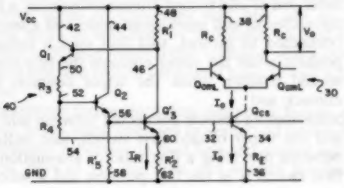
1. A base drive circuit for a transistor which includes a transformer with a primary winding and a secondary winding, a base drive source, and first and second unidirectional current conducting means, the primary winding being connected to the source and to the collector of the transistor by means of the first unidirectional current conducting means, the secondary winding having a first terminal which is connected to the emitter of the transistor, a second terminal which is connected to the collector of the transistor by means of the second unidirectional current conducting means, and a tap which is connected to the base.

4,684,880

REFERENCE CURRENT GENERATOR CIRCUIT

Daniel F. Chan, Huntington Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Dec. 9, 1986, Ser. No. 939,848
Int. Cl.[4] G05F *3/16*
U.S. Cl. 323—316 **15 Claims**



1. A reference current generator circuit, comprising:
a first transistor having a collector terminal connected to a supply voltage;
a first resistor having one terminal connected to the emitter terminal of the first transistor;
a second resistor;
a second transistor having a collector terminal connected to the supply voltage and having a base terminal connected to the other terminal of the first resistor and connected to one terminal of the second resistor;
a third resistor having one terminal connected to the supply voltage;
a fourth resistor having one terminal connected to ground;
a fifth resistor having one terminal connected to ground; and
a third transistor having a collector terminal connected to the base terminal of the first transistor and connected to the other terminal of the third resistor, and having a base

terminal connected to the emitter terminal of the second transistor and connected to the other terminal of the fourth resistor, and having an emitter terminal connected to the other terminal of the second resistor and connected to the other terminal of the fifth resistor;

wherein the reference current output by the circuit is the current flow through the fifth resistor

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4,684,881

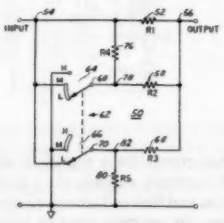
LOW IMPEDANCE SWITCHED ATTENUATOR

Calvin D. Diller, Hillsboro, and Michael J. Burke, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Sep. 17, 1986, Ser. No. 908,836

Int. Cl.[4] H03H *5/00*; H01C *10/50*

U.S. Cl. 323—354 **6 Claims**



1. An attenuator circuit, comprising:

a signal input node;

a signal output node;

a voltage divider network coupled between said input node and said output node, said voltage divider network including

a first attenuator resistor connected between said input node and said output node;

a second attenuator resistor connected at one end thereof to said output signal node, and coupled at another end thereof to ground;

a third attenuator resistor connected at one end thereof to said signal output node;

a switching element coupled between said input node and said voltage divider network, said switching element including a first switch having a wiper connected to another end of said second attenuator resistor, a first contact connected to said input signal node, and a second contact connected to ground, said first switch being in a first position when the wiper contacts the first contact and a second position when the wiper contacts the second contact; and

a compensating resistor connected between said input node and the wiper of said first switch, said voltage divider network providing a first ratio of attenuation when said first switch is in the first position and a second ratio of attenuation when said first switch is in the second position, said attenuator circuit having an input resistance which is the same for both the first and second attenuation ratios.

4,684,882

ELECTRICAL TRANSFORMER HAVING A SOLID CORE SURROUNDING WINDING IN A LOOP CONFIGURATION

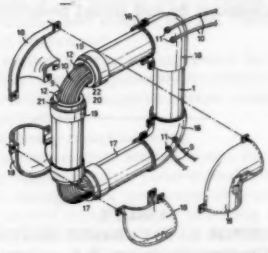
Aurele J. Blain, 23 Allanbrooke Drive, Islington, Ontario, Canada M9A 3N7

Continuation-in-part of Ser. No. 456,329, Feb. 18, 1983. This application Jun. 3, 1985, Ser. No. 740,685

Int. Cl.[4] H01F *15/18*

U.S. Cl. 323—356 **7 Claims**

1. A low-frequency electrical transformer comprising a core having the general shape of an angular loop defined by at least three limbs, and primary and secondary windings extending around the loop, wherein each limb of the core comprises a closed elongate channel of solid magnetic material through which the windings extend, said channels being magnetically connected but including an electrically insulating break for preventing eddy current flow around the loop, wherein the core comprises: an iron angle section member formed into the configuration of said angular loop, so that one side of the angle



section member forms the bases of the said channels and the other side of the member forms one side of each said channel; individual angle section members disposed one along each limb of the core and co-operating with the first mentioned angle member to form said channels; and bracket means clamping said angle section members together.

4,684,883

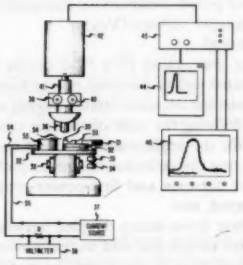
METHOD OF MANUFACTURING HIGH-QUALITY SEMICONDUCTOR LIGHT-EMITTING DEVICES

David A. Ackerman, Hopewell; Renato M. Camarda, Fanwood; Robert L. Hartman, Warren, all of N.J., and Magaly Spector, Wyomissing, Pa., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 13, 1985, Ser. No. 733,047

Int. Cl.[4] G01N *27/00*; G01J *1/00*; H01J *3/14*

U.S. Cl. 324—71.5 **8 Claims**



1. A method of grading a light-emitting stripe geometry structure having a certain stripe width comprising the steps of:

applying an excitation to the structure so as to produce a spontaneous light emission having a near-field intensity which is a function of position across the stripe;

measuring said intensity of the near-field of the spontaneous emission of the light-emitting structure across the stripe to

establish a near-field intensity profile having a characteristic width at various intensities;

determining a width of the measured intensity profile; and

grading said structure according to whether the width of the intensity profile is above or below a predetermined cut-off value.

4,684,884

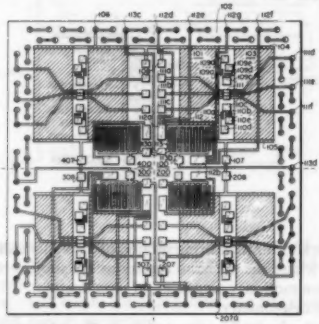
UNIVERSAL TEST CIRCUIT FOR INTEGRATED CIRCUIT PACKAGES

Ernest E. Soderlund, Hoffman Estates, Ill., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Jul. 2, 1985, Ser. No. 751,106

Int. Cl.[4] G01R *31/28*

U.S. Cl. 324—73 R **11 Claims**



1. A testing arrangement for use in integrated circuit packages, said testing arrangement comprising:

testing means effective to facilitate testing of a plurality of integrated circuit packaging parameters;

a first plurality of bonding pads connected to said testing means, effective to facilitate connection of said testing means via wire bonding techniques; and

a second plurality of bonding pads connected to said first plurality of bonding pads, effective to connect said testing means;

a plurality of test circuits, each having a heating element of the same characteristic resistance and each connected to a different portion of said first plurality of bonding pads;

said test circuits being arranged in a square array of parallel connected groups of series connected test circuits, wherein the number of parallel connected groups is equal to the number of series connected test circuits in each of said groups;

whereby the heating resistance of said testing arrangement is equal to the characteristic resistance of the heating element of each of said test circuits.

4,684,885

ARRANGEMENT FOR ON-LINE DIAGNOSTIC TESTING OF AN OFF-LINE STANDBY PROCESSOR IN A DUPLICATED PROCESSOR CONFIGURATION

Harry A. Chapman, Phoenix, and David J. Lauson, Glendale, both of Ariz., assignors to GET Communication Systems Corporation, Phoenix, Ariz.

Filed Nov. 4, 1985, Ser. No. 795,051

Int. Cl.[4] G01R *31/00*; G06F *11/00*

U.S. Cl. 324—73 R **16 Claims**

1. In a duplex processor configuration system having an on-line active processor and an off-line standby processor, an arrangement for diagnostic testing of said off-line standby processor comprising:

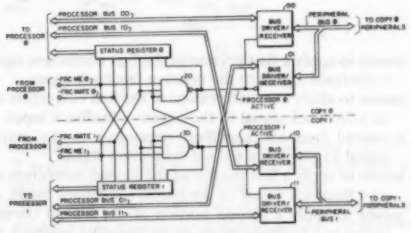
first and second sets of peripheral devices;

first and second processor buses connected to said on-line active processor;

first and second peripheral buses connected to said corresponding first and second sets of peripheral devices respectively, said first and second peripheral buses being operated to connect said on-line active processor to said first and second sets of peripheral devices via said first and second processor buses;

bus control means connected to said first and second processor buses, to said first and second peripheral buses, said bus control means being operated to connect said first and second peripheral buses to said on line active processor via said active processor's first and second processor buses and to said off-line standly processor via said standby processor's first and second processor buses;

status control means connected to said standby processor, to said active processor and to said bus control means, said status control means being normally operated in response to force active and force mate active signals of said active and said standby processor to enable said bus control means to connect said first and second peripheral buses to said active processor via said active processor's first and second processor buses and to disconnect said standby processor's first and second processor buses from said first and second peripheral buses;



each said processor including logic control means for producing signals for transmission to said status control means;

said status control means being further operated in response to a first value of said force active signal and of said force mate active signal to connected said first and second peripheral buses to said standby processor via said first and second processor buses while retaining said connection of said first and second peripheral buses to said active processor;

each said processor further including diagnostic means, said diagnostic means being operated to verify said connection of said standby processor to said first and second sets of peripheral devices via said first and second peripheral buses;

said logic control means being further operated in response to said diagnostic means to produce said force active and said force mate active signals of a second value; and

said status control means being further operated in response to said force active signal and said force mate active signals of said second value to disconnect said standby processor from said first and said second peripheral buses while retaining said connection of said first and second peripheral buses to said active processor.

4,684,886

AUTOMATIC EQUALIZER

James H. Doyle, 1247 W. Grove Ave., Orange, Calif. 92665

Filed May 17, 1985, Ser. No. 735,470

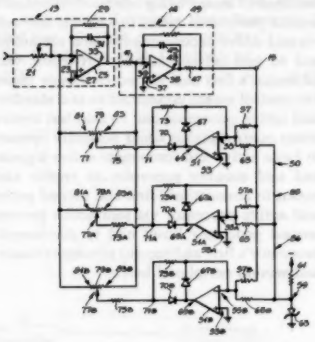
Int. Cl.[4] G01R *15/10*; G06G *7/12*; H03F *1/36*

U.S. Cl. 324—132 **10 Claims**

1. An automatically equalized amplifier to provide an amplified signal in response to an input signal, comprising:

a signal amplifier having positive and negative feedback inputs and operative to provide an amplified signal in response to an input signal, a feedback signal applied to the positive feedback input tending to increase the gain of the signal amplifier and a feedback signal applied to the negative feedback input tending to reduce the gain of the signal amplifier;

a first feedback amplifier, responsive to the amplified signal to provide a first correction signal;



means to apply a first portion of the first correction signal as a feedback signal to the positive feedback input;

means to apply a second portion of the first correction signal as a feedback signal to the negative feedback input;

a second feedback amplifier, responsive to the amplified signal to provide a second correction signal;

means to apply a first portion of the second correction signal as a feedback signal to the positive feedback input; and

means to apply a second portion of the second correction signal as a feedback signal to the negative feedback input.

4,684,887

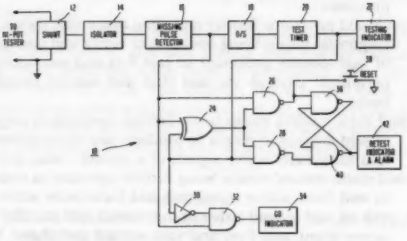
HIGH VOLTAGE TEST CONFIRMATION APPARATUS

Jimmy L. Stewart, Leesport, Pa., assignor to General Battery Corporation, Reading, Pa.

Filed Jun. 24, 1986, Ser. No. 877,886

Int. Cl.[4] G01R *31/00*; G08B *21/00*

U.S. Cl. 324—158 R **10 Claims**



1. A high voltage test confirmation apparatus comprising:

(a) means for detecting the magnitude of a test current flowing through an article under test as a result of application to said article of a test voltage having a predetermined magnitude, and for providing a first signal which commences upon detection of a test current magnitude which exceeds a predetermined value and which terminates when said magnitude falls below said predetermined values;

(b) means for providing a second signal which commences upon commencement of said first signal and which terminates upon expiration of a predetermined test time interval;

(c) means for providing a test complete signal when said second signal terminates before said first signal; and

(d) means for providing a retest signal when said first signal terminates before said second signal.

4,684,888

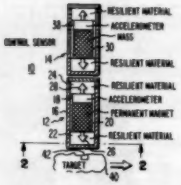
APPARATUS SUBJECT TO RANDOM ACCELERATIVE MOTION FOR SENSING MOTION OF A MAGNETICALLY SUSCEPTIBLE PART

Andrew Tabak, Burlington, Mass., assignor to RCA Corporation, Princeton, N.J.

Filed Jan. 31, 1985, Ser. No. 696,747

Int. Cl.[4] G01B *7/14*; G01N *27/72*; G01R *33/00*; H01L *41/04*

U.S. Cl. 324—207 **6 Claims**



1. Apparatus for measuring motion of a magnetically susceptible part where the part and apparatus are subject to random accelerative motion, comprising in combination:

a first accelerometer;

a magnet physically arranged with the accelerometer for movement therewith such that as a magnetically susceptible part passes said magnet, said accelerometer produces a corresponding first signal component and also produces a second signal component corresponding to the random accelerative conditions to which the apparatus is subject, said second signal component being greater in value than said first signal component;

a second accelerometer;

a nonmagnetic body substantially identical in size, shape and weight to said megnet and physically arranged with said second accelerometer as said magnet is arranged with said first accelerometer so said second accelerometer produces said second signal component without producing said first signal component; and

means receptive of said first and second signal components from said first accelerometer and second signal component from said second accelerometer for subtracting the one of said first and second accelerometer second signal components from the other of said first and second accelerometer second signal components to produce said first signal component corresponding substantially only to the passage of said magnetically susceptible part past said magnet.

4,684,889

NMR APPARATUS COMPENSATED FOR PRIMARY FIELD CHANGES

Keiki Yamaguchi; Kazuya Hoshino, and Hideto Iwaoka, all of Tokyo, Japan, assignors to Yokogawa Hokushin Electric Corporation and Yokogawa Medical Systems, Limited, both of Tokyo, Japan

Filed Apr. 4, 1985, Ser. No. 719,750

Claims priority, application Japan, Apr. 20, 1984, 59-79659

Int. Cl.[4] G01N *24/08*

U.S. Cl. 324—308 **2 Claims**

1. An NMR diagnostic imaging apparatus comprising

means for positioning a field intensity measuring object of a given shape and having known properties in the vicinity of a subject to be examined such that said field intensity

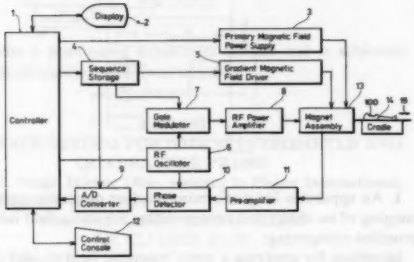
measuring object and said subject are not overlapped at least in one direction of projection;

means for applying a primary magnetic field to said subject and to said object;

means for applying RF pulses that give nuclear magnetic resonance to the nuclei of atoms constituting the tissue of said subject and of atoms of said object;

means for applying gradient magnetic fields to project an NMR signal of said nuclei of atoms at least in one direction and an NMR signal of said object;

means for phase-detecting and monitoring the NMR signals projected by said gradient magnetic field applying means and representing the subject and the object; and



arithmetic means for constructing an image of the tissue of the subject from an output signal from said monitoring means;

wherein said means for phase-detecting and monitoring said NMR signals comprises

means for detecting the phase of the NMR signals at different time intervals and comparing the phase with the RF pulses,

means for monitoring the Larmour frequency of the nuclei of atoms in said object, and

means for selectively controlling the oscillation frequency of the RF pulses to conform to the Larmour frequency when the phase is detected whereby the variations in the primary magnetic field have no effect on the constructed image.

4,684,890

PROCESS FOR THE GENERATION AND PROCESSING OF SIGNALS FOR OBTAINING BY NUCLEAR MAGNETIC RESONANCE A DISTORTION-FREE IMAGE FROM A HETEROGENEOUS POLARIZATION FIELD

André Briguet, Villeurbanne, and Maurice Goldman, Massy, both of France, assignors to Commissariat a l'Energie Atomique, Massy, France

Filed Dec. 3, 1985, Ser. No. 804,045

Claims priority, application France, Dec. 12, 1984, 84 18997

Int. Cl.[4] G01R *33/20*

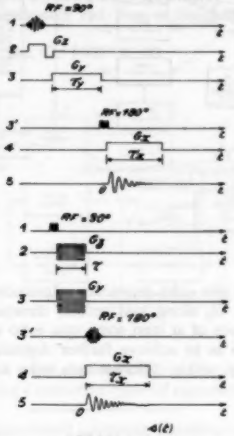
U.S. Cl. 324—309 **3 Claims**

1. A process for the generation and processing of signals for obtaining a nuclear magnetic resonance image, which is free from distortions on the basis of an inhomogeneous polarization field $B=Bo+E(x,y,z)$, using the known methods of coding the image in two or three dimensions (2D,FT and 3D,FT) involving the application of a 90° radiofrequency pulse in the xOy plane, then phase coding for a time τ followed by frequency coding by applying along Ox a reading gradient during the acquisition of the free precession signal, which then undergoes Fourier transformations relative to time and relative to the gradient or gradients applied and which is collected in complex form, wherein the following stages are involved:

(a) during a first series of signal acquisition sequences involving phase coding and frequency coding, the complex signals $s_1(\tau,t)$ are collected in the known manner;

(b) during a second series of sequences involving the successive application of the same gradients, the free precession system is subject to a second 180° radiofrequency pulse at the start of establishing each reading gradient, so as to change to $-\phi$ (or $\pi-\phi$ as a function of the particular case) the ϕ phases acquired by the different magnetic moments during phase coding and the n imaginary signals $s_2(\tau,t)$ are collected, stages (a) and (b) being either successive or interleaved in time;

(c) the conjugate signals $s_2^*(\tau,t)$ of $s_2(\tau,t)$ are formed, which are such that $s_2^*(\tau,t)=s_1(\tau,-t)$, and they are associated one by one with their homolog $s_1(\tau,t)$ so as to form n



complex signals $s(\tau,t)$ in which t varies from $-T$ to $+T$, T being the acquisition time of each signal counted from the start of applying the reading gradient;

(d) the Fourier transforms with respect to time t and with respect to the gradient or gradients applied are performed on these signals $s(\tau,t)$ for which $-T<t<+T$, which supplies a multidimensional complex image, whose real and imaginary parts R, I respectively only have pure absorption terms;

(e) on each point x,y,z are performed distortion corrections along Ox and magnetization intensities are allocated by successively calculating the correct value of the phase

$$\phi = \text{Arc cos}\frac{R}{\sqrt{R^2+I^2}}$$

the function E(x,y,z) representing the cartography of the field by the relation $\phi(x,y,z)=\gamma E(x,y,z)\tau$, then by the relation $Gx\cdot x+E(x,y,z)-Gx\cdot x'=0$, the value x' of x to which is to be allocated the magnetization intensity found.

4,684,891

RAPID MAGNETIC RESONANCE IMAGING USING MULTIPLE PHASE ENCODED SPIN ECHOES IN EACH OF PLURAL MEASUREMENT CYCLES

David A. Feinberg, Berkeley, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed Jul. 31, 1985, Ser. No. 760,832

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **26 Claims**

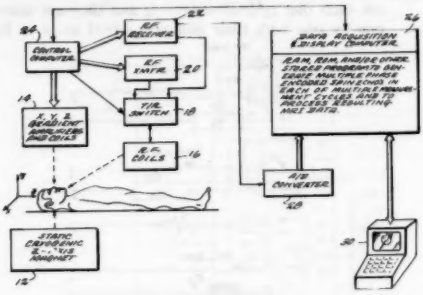
1. A method for acquiring NMR image data from an object, said method comprising the steps of:

eliciting and recording plural NMR spin echoes from a selected slice of the object while encoding a first dimension of spatial information therein by imposing a magnetic field gradient G_x along an x-axis dimension during readout of the recorded spin echo signals;

said plural spin echoes being elicited in each of plural acqui-

sition cycles, each of which cycles also elicits a train of plural spin echoes by exciting nuclei within said selected slice with a first NMR rf signal pulse followed by a train of 180° NMR rf signal pulses;

imposing a cycle-dependent magnitude of magnetic field gradient G_y along a y-axis dimension at some time during each cycle to achieve spatial phase encoding along said second dimension; and



imposing a spin-echo-dependent magnitude of magnetic field gradient G_y along said second dimension prior to the occurrence of at least some spin echo signals in a given cycle so as to achieve further degrees of y-axis phase encoding within different spin echo signals in a given cycle.

4,684,892

NUCLEAR MAGNETIC RESONANCE APPARATUS

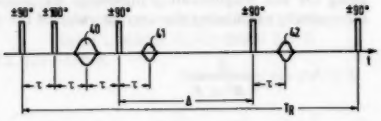
Rainer Graumann, Hoechstadt, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 20, 1986, Ser. No. 841,952

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1985, 3514530

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **2 Claims**



1. A nuclear magnetic resonance apparatus for examining a subject comprising:

means for generating a fundamental magnetic field in which said subject is disposed;

means for generating a plurality of gradient fields in mutually perpendicular planes in which said subject is disposed; and

means for generating selected sequences of RF pulses irradiating selected portions of said subject and for receiving spin-echo from said subject caused by said RF pulses in a chronological succession of

(a) an RF pulse having a flip angle of about ±90° at a point in time O;

(b) an RF pulse having a flip angle of about ±180° at a point in time τ,

(c) a ±180° spin echo at a point in time 2τ;

(d) an RF pulse having a flip angle of about ±90° at a point in time 3τ;

(e) a ±90° spin echo at a point in time 4τ;

(f) at least one RF pulse having a flip angle of at most about ±90° at a point in time $3\tau+\Delta$ and

(g) a stimulated echo at a point in time $4\tau+\Delta$.

4,684,893

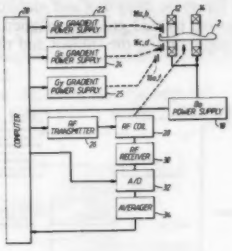
FIELD GRADIENT CORRECTION APPARATUS FOR COMPENSATING STATIC FIELD INHOMOGENEITIES IN NMR IMAGING SYSTEM

Fumitoshi Kojima, and Mitchio Mitomi, both of Otawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 23, 1985, Ser. No. 812,847

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—312 **4 Claims**



1. An apparatus for performing nuclear magnetic resonance imaging of an object and compensating for static field inhomogeneities comprising:

(a) means for applying a static magnetic field to said object along a first axis thereof;

(b) means for applying a first magnetic field gradient G_z along a selected one of said first, second and third axes;

(c) means for applying second and third mutually orthogonal field gradients G_x, G_y along directions perpendicular to said selected axis;

(d) means for applying radio frequency signals to excite a selected region of said object in a plane perpendicular to said first axis and for providing an NMR spin-echo signal;

(e) means for varying the magnitude of at least the G_x and G_y magnetic field gradients for producing a varying orientation of a composite gradient in the plane containing said selected region;

(f) means for detecting said NMR spin-echo signal for different orientations of said composite gradient to derive imaging data of said selected regions;

(g) means for applying a plurality of magnetic field offsets gradients g_x in the direction of G_x while detecting said NMR spin-echo signals in the absence of magnetic field gradients G_y;

(h) means for applying a plurality of magnetic field offset gradients g_y in the direction of G_y while detecting said NMR spin-echo signals in the absence of magnetic field gradients G_x;

(i) means for calculating the decay time T_2^* for each of said plurality of magnetic field offset gradients g_x, g_y;

(j) means for selecting the largest of said calculated values T_2^* for each of said offset gradients g_x, g_y;

(k) means for adjusting the magnetic field offset gradients g_x, g_y to correspond to the largest selected values of T_2^* for g_x, g_y respectively; and

(l) means for adding said offset field gradients g_x, g_y to said field gradients G_x, G_y for performing NMR imaging.

4,684,894

NMR SURFACE COIL POSITIONING DEVICE

James C. Bliehall, Pacifica, Calif., assignor to Diasonics, Inc., San Francisco, Calif.

Filed May 12, 1986, Ser. No. 861,869

Int. Cl.[4] G01R *33/20*

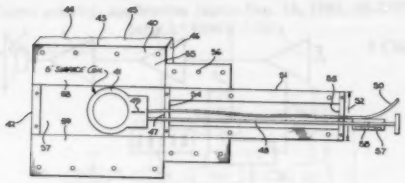
U.S. Cl. 324—318 **11 Claims**

1. An apparatus for positioning a scanning coil located underneath a fixed object comprising:

a container having two oppositely disposed members therein

such that an elongated slot is formed between said members to accept said coil;

an elongated rod extending into said slot and coupled to said coil to slideably move said coil within said slot;



whereby a positioning adjustment of said coil is achieved without moving said fixed object.

4,684,895

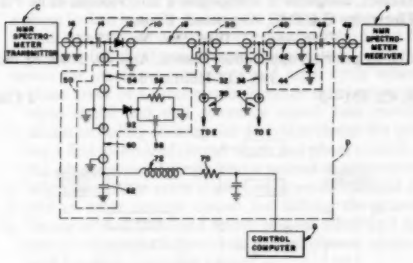
INTERFACE SYSTEM FOR NMR SPECTROMETER AND QUADRATURE PROBE

George J. Misic, Hiram, Ohio, assignor to Picker International, Inc., Highland Hts., Ohio

Filed Aug. 5, 1985, Ser. No. 762,306

Int. Cl.⁴ G01R *33/20*

U.S. Cl. 324—322 **20 Claims**



3. An interface for interfacing a magnetic resonance spectrometer and a probe, the interface comprising:

a first RF switch means for selectively passing and blocking the passage of radio frequency signals, the first RF switch means being operatively connected with a first probe port and adapted to be connected with a magnetic resonance spectrometer transmitter;

a phase shift means for phase shifting radio frequency signals by a selected phase angle, the phase shift means being operatively connected between the first probe port and a second probe port;

a second RF switch means for selectively passing and blocking the passage of radio frequency signals, the second RF switch means being operatively connected with the second probe port and adapted to be connected with a magnetic resonance spectrometer receiver; and,

control means for selectively controlling the first and second RF switch means such that one RF switch means blocks the passage of radio frequency signals when the other RF switch means is passing radio frequency signals, whereby the magnetic resonance receiver is isolated from the probe ports when the transmitter is transmitting radio frequency signals to the probe ports with the radio frequency signals at the first port leading the radio frequency signals at the second port by the selected phase angle and whereby the magnetic resonance transmitter is isolated from the probe ports when the receiver is receiving radio frequency signals from the probe ports with the radio frequency signals from the first port lagging the radio frequency signals from the second port by the selected phase angle.

4,684,896

TESTING METHOD FOR IGNITION SYSTEMS OF INTERNAL COMBUSTION ENGINES IN MOTOR VEHICLES

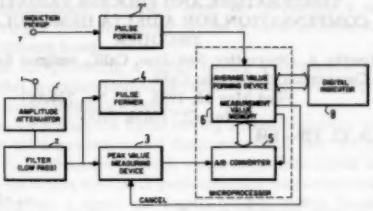
Walter Weishaupt, Munich, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke AG, Fed. Rep. of Germany

Filed Nov. 16, 1984, Ser. No. 671,914

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1983, 3341880

Int. Cl.⁴ F02P *17/00*

U.S. Cl. 324—399 **17 Claims**



1. A method for an internal combustion engine of testing an ignition system having a repetitive cycle of operation comprising the steps of

sensing at a predetermined operating condition of said engine a first instantaneous ignition voltage amplitude at a predetermined time instant in a cycle to produce a first output signal,

storing said first output signal,

sensing at said predetermined operating condition a second instantaneous ignition voltage amplitude at said predetermined time instant in a cycle subsequent to sensing of said first instantaneous voltage amplitude to produce a second output signal, and

comparing said first output signal with said second output signal to produce an alarm signal.

4,684,897

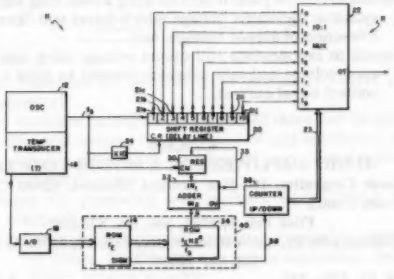
FREQUENCY CORRECTION APPARATUS

Gerald P. Richards, and Andre M. Renard, both of Framingham, Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jan. 3, 1984, Ser. No. 567,828

Int. Cl.⁴ H03K *5/00*; **G06G** *7/10*; **H03L** *1/00*

U.S. Cl. 328—162 **10 Claims**



1. In combination:

(a) means for producing a plurality of successively time-delayed signals, each one having the same frequency and

varying from a nominal frequency in accordance with variations in the operating environment of the producing means; and

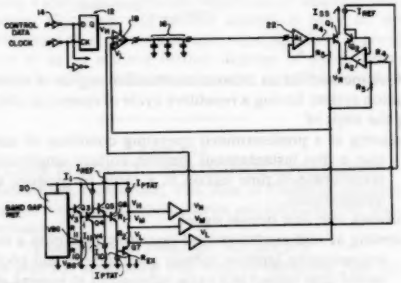
(b) means, responsive to a control signal representative of said variations in the operating environment of said producing means, for successively coupling each of the plurality of time-delayed signals to an output terminal at a predetermined coupling change rate, said predetermined coupling change rate being selected to provide a signal at the output terminal having a frequency substantially equal to the nominal frequency substantially independent of said variations in the operating environment of the producing means.

4,684,898

TEMPERATURE AND PROCESS VARIATION COMPENSATION FOR A DELTA DEMODULATION DECODER

Timothy A. Dhuyvetter, San Jose, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed May 15, 1985, Ser. No. 734,417
Int. Cl.[4] H03K 9/00
U.S. Cl. 329—104 **2 Claims**



1. A circuit for processing control signals is a control data signal decoder incorporating temperature and process variation compensation means comprising:

means to generate a low temperature coefficient stable voltage independent of temperature, resistance and collector current for use as a control and reference voltage in said circuit;

means to generate a stable reference current for use as a control and reference current in said circuit;

means to receive and store temporarily a stream of logarithmically encoded control bits for a delta demodulation decoder;

means to detect with a low pass filter the average dc value of the duty cycle of said control bit stream;

means to control pulse height by using a switching amplifier, such that the output voltage which drives said filter is not a function of supply voltage; and

means to exponentiate said output voltage using said reference voltage and said reference current to yield a stable control signal current.

4,684,899

AUDIO AMPLIFIER FOR A MOTOR VEHICLE

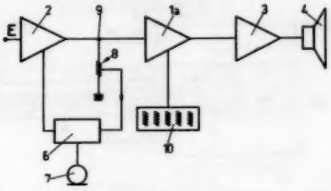
Claude Carpentier, 163 Rue Armand Silvestre, 92400 Courbevoie, France

Filed Feb. 6, 1986, Ser. No. 826,800
Claims priority, application France, Feb. 11, 1985, 85 01904
Int. Cl.[4] H03G 3/20
U.S. Cl. 330—149 **2 Claims**

1. Low frequency amplifier, mainly for use in motor vehicles, comprising

an equalizing device and

means for compensating ambient noise, said means including an ambient-noise microphone, a controlled-gain amplifier controlled by a control voltage and having an outlet with a signal pickup point, and a control circuit for generating said control voltage and having a first input connected to



said ambient-noise microphone and a second input connected to said signal pick-up,

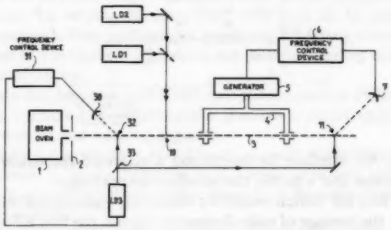
said equalizing device being a fixed-correction-type device, preset by fixed electronic components, downstream of said signal pick-up point.

4,684,900

OPTICAL PUMPING CESIUM RESONATOR AND LASER DIODE DETECTION

Gérardo Avila, Antony, France, and Pierre Cerez, Mexico, Mexico, assignors to Compagnie d'Electronique et de Piezo - Electricite C.E.P.E., Argenteuil, France

Filed Apr. 23, 1986, Ser. No. 855,419
Claims priority, application France, Apr. 30, 1985, 85 06572
Int. Cl.[4] H03L 7/26
U.S. Cl. 331—3 **2 Claims**

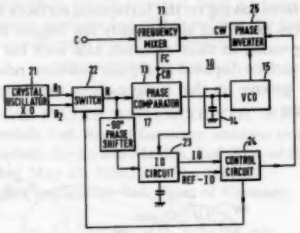


1. A laser diode detection and optical pumping cesium resonator comprising a cesium oven emitting a flow of cesium atoms, a resonating cavity situated in the path of said flow, at least a first laser diode and possibly a second laser diode delivering a light beam which interacts with the flow of atoms in a first interaction zone situated between the oven and the cavity so as to create optical pumping, a generator generating a hyperfine resonance frequency of the cesium, means for detecting the fluorescence emitted by the cesium atoms at the output of the cavity, said detection means comprising a first detector for detecting the fluorescence light emanating from a second interaction zone resulting from the interaction of the atom jet leaving the cavity and a light beam emitted by a third laser diode, said first detector delivering the signal representative of the second interaction to frequency control means so as to control the frequency of the generator by making it dependent on the hyperfine transition of the cesium, wherein a part of the light beam emitted by said third diode is directed onto the flow of atoms leaving the oven so as to create a third interaction zone, a second detector picking up the fluorescence light emanating from said third interaction zone and delivering a signal representative of this third interaction to means for controlling the frequency of said third laser diode.

4,684,901
AUTOMATIC PHASE CONTROL CIRCUIT

Mitsumo Kawano, Honjo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 16, 1986, Ser. No. 908,027
Claims priority, application Japan, Sep. 18, 1985, 60-205745
Int. Cl.[4] H04N *5/91*
U.S. Cl. 331—25 9 Claims



1. An automatic phase control circuit comprising:

a signal input circuit for receiving an input signal which changes its phase alternately between first and second phases with a predetermined input cycle;

means for generating a reference signal which changes its phase alternately between third and fourth phases with a reference cycle of predetermined alternation timing;

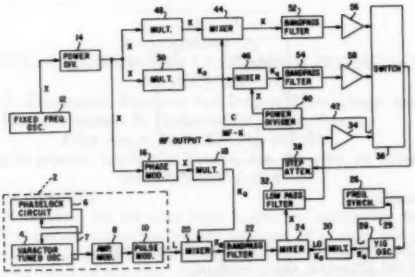
a phase locked loop for locking the first and second phases of said input signal into the corresponding third and fourth phases of said reference signal, respectively;

means for monitoring in every said input cycle whether a phase error of a predetermined range exists between said input signal and said reference signal, said monitoring means including an irregular detection circuit for producing a first monitored output when said phase error is out of the predetermined range, and a second monitored output when said phase error is within the predetermined range, and an error control circuit for shifting the alternation timing of said third and fourth phases, when said second monitored output follows said first monitored output from said irregular detection circuit.

4,684,902
RADIO FREQUENCY SIGNAL GENERATOR

Francis X. McGroary, Westport, Conn., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jan. 27, 1986, Ser. No. 822,557
Int. Cl.[4] H03B *21/02*
U.S. Cl. 331—38 11 Claims



1. A radio frequency signal generator, characterized by:

means for providing a baseband radio frequency signal having predetermined ultrafast modulation characteristics, and having a fixed center frequency within a first predetermined frequency band and predetermined frequency deviation rates, including phaselock frequency modulation means, a relatively fast tuning oscillator connected to the phaselock frequency modulation means for locking to said means and for providing a locked output, amplitude modulator means connected to the oscillator for modulating the amplitude of the locked output, and pulse modulator means connected to the amplitude modulator means and responsive to the modulated output therefrom for providing the baseband radio frequency as a pulsed radio frequency output;

means for providing a signal having a fixed frequency within a second predetermined frequency band;

means for mixing the baseband radio frequency signal and the signal having the fixed frequency within the second predetermined frequency band for providing a signal having a fixed frequency within a third predetermined frequency band;

means for providing a signal having a frequency which varies in predetermined increments within a fourth predetermined frequency band;

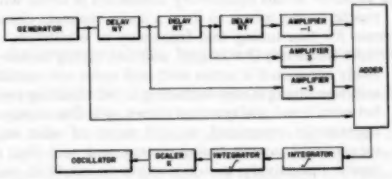
means for mixing the signal having a fixed frequency within the third predetermined frequency band and the signal having a frequency which varies in predetermined increments within the fourth predetermined frequency band for providing a signal the fourth predetermined frequency band for providing a signal having a frequency which varies within a fifth predetermined frequency band; and

means connected to the last mentioned means for routing and attenuating the signal therefrom and for providing an output radio frequency signal having a frequency which varies within a predetermined frequency band range and having the modulation characteristics of the baseband radio frequency signal.

4,684,903
CONTROLLED OSCILLATOR HAVING RANDOM VARIABLE FREQUENCY

Eugene V. Hunt, El Toro; Charles G. Mosley, Irvine, and Charles E. Wheatley, III, Vista, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 191,648, Sep. 22, 1980. This application Apr. 30, 1984, Ser. No. 623,291
Int. Cl.[4] H03B *29/00*
U.S. Cl. 331—78 11 Claims



1. Apparatus for generating an oscillatory output signal, comprising:

an oscillator having means associated therewith for controlling and varying the frequency of said oscillatory output signal in response to variations of an oscillator input control signal; and

means for generating said oscillator input control signal, comprising:

a binary random number generator generating a sequence of pulses, V_1, having a constant magnitude and randomly varying polarity;

means for operating on V_1 according to the algorithm

$$V_2 = V_1(1 + e^{\pm NT})^n,$$

-continued

$V_3 = \Sigma V_2$,

$V_{n+1} = \Sigma V_n$,

wherein n is a positive interger; and means for scaling the magnitude of

V_{n+1} to form said oscillator input control signal.

4,684,904

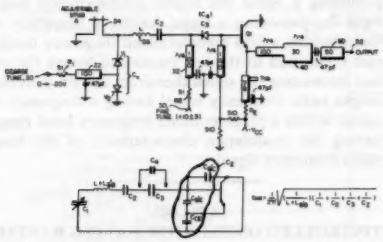
LOW PHASE NOISE TWO PORT VOLTAGE CONTROLLED OSCILLATOR

Grant H. Watkins, Upper Marlboro, and Lester K. Staley, Baltimore, both of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 6, 1986, Ser. No. 816,596

Int. Cl.[4] H03B 5/12

U.S. Cl. 331—117 R **9 Claims**



1. A low phase noise two port voltage controlled oscillator apparatus comprising in combination:

an amplifier means with an input and an output said amplifier means comprising an NPN transistor in which the collector is grounded, the emitter is said output and the base is said input,

means for coarse tuning the frequency of oscillation of a radio frequency (RF) signal,

an inductor means operatively connected in series with said coarse tuning means to form a series resonant circuit,

means for fine tuning said frequency of oscillation of said radio frequency (RF) signal, said fine tuning means operatively connected in series with said series resonant circuit, said fine tuning means including a DC blocking capacitor between it and said resonant circuit, said fine tuning means operatively connected to said input of said amplifier means, said coarse tuning means and said fine tuning means operatively in conjunction to establish said frequency of oscillation said radio frequency (RF) signal which is applied to said input of said amplifier means, said radio frequency (RF) signal appearing at said output of said amplifier means.

4,684,905

LOAD-BEARING DETENT MECHANISM

George Capek, Frederick, Md., assignor to Weinschel Engineering, Gaithersburg, Md.

Continuation of Ser. No. 561,171, Dec. 14, 1983, abandoned. This application Aug. 5, 1985, Ser. No. 763,774

Int. Cl.[4] H01P 1/22; G05G 5/06

U.S. Cl. 333—81 R **30 Claims**

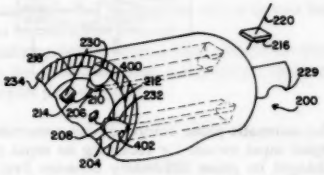
1. In a switchable attenuator device having a plurality of attenuators selectively rotatable to an operative position, a load-bearing detent mechanism for registering the attenuator device when an attenuator is rotated to the operative position, the load-bearing detent mechanism comprising:

an axially elongated inner member having an outer cylindrical surface;

an axially elogated outer member having an inner cylindrical surface wherein said inner cylindrical surface is coaxial with and encircles said outer cylindrical surface and

wherein said inner member and said outer member are rotatable relative to each other; and

said surfaces having on the juxtaposed surfaces a plurality of grooves extending substantially the lengths of said members parallel to their common axis with the grooves on each surface disposed at angular positions relative to each other groove on that surface about the periphery of the surface;



a conductive leaf spring having a bow in a plane perpendicular to the axis of said members disposed in each of said grooves in one of said surfaces, the bow in said leaf spring protruding sufficiently to engage and seat in a groove in said other member,

each of said springs extending the length of its associated groove, and

means for electrically grounding each end of each of said leaf springs,

wherein said attenuator in said operative position forms a portion of an electrical circuit by the creation of electrical connections at each end of said attenuator when said attenuator is rotated into its operative position, and

means for rotating said members relative to one another.

4,684,906

SOLID ULTRASONIC DELAY LINE

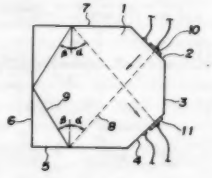
Takeo Yokoyama, Ebina, Japan, assignor to Showa Electric Wire & Cable Co., Ltd., Japan

Filed May 28, 1986, Ser. No. 867,536

Claims priority, application Japan, Jun. 14, 1985, 60-130379; Jul. 17, 1985, 60-158865

Int. Cl.[4] H03H 9/36

U.S. Cl. 333—143 **7 Claims**



1. A solid ultrasonic delay line comprising:

a solid ultrasonic delay medium;

polygonal multiple-reflective surfaces formed on said medium;

an input transducer having one surface disposed on a first of said reflective surfaces and radiating longitudinal waves which are transformed into transverse waves by a second

of said reflective surfaces, the transverse waves being transformed back to longitudinal waves by a third of said reflective surfaces;

an output transducer having one surface disposed on a fourth of said reflective surfaces and receiving the last-mentioned longitudinal waves;

main boundary surfaces perpendicular to said reflective surfaces and transforming spurious waves of said longitudinal waves radiated from said input transducer into transverse waves; and

ultrasound absorbers which cover at least portions of said main boundary surfaces and which receive the transverse waves from said main boundary surfaces.

4,684,907

ELECTRICAL FILTER WITH ACOUSTIC WAVES

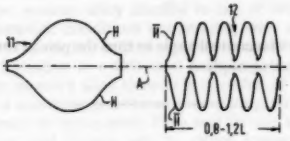
Peter Zibis, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 21, 1986, Ser. No. 865,430

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1985, 3519853

Int. Cl.[4] H03H *9/72, 9/145*

U.S. Cl. 333—196 **13 Claims**



1. An electrical filter wherein acoustic waves run close to a surface in a substrate thereof, comprising:

at least one input transducer of a first transducer type and at least one output transducer of a second transducer type associated with a substrate;

the input and output transducers having respective finger-overlap weightings and being arranged in-line in a wave propagation direction;

the first type transducer having a finger weighting and associated overlap profile defined by a prescribed transfer function based on an initial assumption that the second type transducer is first considered to be a theoretical transducer having no finger weighting and a given length, said overlap profile being shaped by an envelope of finger overlaps;

the second type transducer having a finger weighting and associated overlap profile which is an at least 3-fold repetition of the overlap profile of the first transducer type; and

a length of the second type transducer being at least approximately the same as said given length of said given theoretical unweighted transducer upon which the first type transducer is based.

4,684,908

CIRCULAR WINDOW FOR ULTRA-HIGH FREQUENCY WAVEGUIDE

Jean C. Kuntzmann, Boulogne, and Jacques Tikes, Orsay, both of France, assignors to Thomson-CSF, Paris, France

Filed Jan. 9, 1985, Ser. No. 689,985

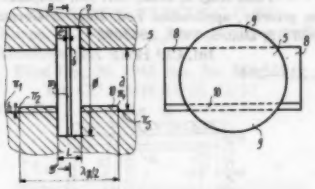
Claims priority, application France, Jan. 17, 1984, 84 00664

Int. Cl.[4] H01P *1/08*

U.S. Cl. 333—252 **11 Claims**

1. A window for an ultra high frequency waveguide for insertion between two waveguide sections of a main waveguide which is designed for transmitting wave energy of an operating band of wavelengths centered about a wavelength λg each waveguide section having a long side dimension and a short side dimension comprising

an assembly including a circular plate of dielectric material and a section of circular waveguide of the same diameter as the plate for transversely supporting the plate, the diameter of the circular waveguide being intermediate between the long and short side dimensions of the two waveguide sections, for forming inductances, and the length of the section of circular waveguide being shorter than λg/2 and such that said inductances compensate for



the intrinsic capacitance of the circular plate, whereby the reactance of the assembly is essentially cancelled out at the wavelength λg and

half-wave impedance transformer means included within the two waveguide sections, for cooperating with the assembly for matching in the operating band of wavelengths.

4,684,909

ELECTROMAGNETIC RELAY

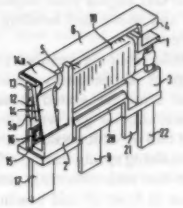
Michael Dittmann, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 18, 1986, Ser. No. 840,653

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1985, 3510966

Int. Cl.[4] H01H *67/02*

U.S. Cl. 335—128 **18 Claims**



1. An electromagnetic relay having a terminal plane and comprising:

a hollow coil body carrying an excitation coil with a coil axis extending parallel to said terminal plane;

a one-piece flat stock core yoke element having at least a yoke leg and a core leg, said core yoke element being bent and crimped such that said yoke leg is disposed in a plane substantially perpendicular to the plane of said core leg and said yoke leg having a center line in said plane of said core leg, said core leg extending axially through said coil and having an exposed free end held by said coil body, and said yoke leg being disposed outside of and adjacent to said coil;

a leaf spring with an armature and a contact pad mounted thereon;

means for mounting said leaf spring for pivotal movement around an axis parallel to said coil axis such that said armature forms a working gap with said free end of said core leg; and

a stationary contact element anchored in said terminal plane disposed for making and breaking with said contact pad upon movement of said leaf spring.

4,684,910

ARMATURE RETAINING SPRING AND COIL FLANGE CONTACT CHAMBER FOR AN ELECTROMAGNETIC RELAY

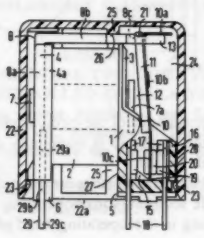
Michael Dittmann, Berlin, and Heinz Stadler, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 8, 1986, Ser. No. 894,825

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1985, 3528715; Dec. 5, 1985, 3543092

Int. Cl.[4] H01F *7/13*

U.S. Cl. 335—274 **11 Claims**



1. An electromagnetic relay, comprising:

a coil forming a base body and having a winding around a core;

first and second flanges at respective opposite ends of said winding, said first flange having a portion forming a pocket-shaped contact chamber;

an angled yoke having a first leg at said second flange, said first leg being perpendicular to an axis of said coil and being coupled to said core, a terminal spine formed at a free edge of said first leg,

a second leg of said angled yoke disposed parallel to the axis of said coil and above said winding and having a bearing edge at a free end,

at least one male retaining member projecting beyond said bearing edge of said second yoke leg;

a plate-shaped armature seated at said bearing edge and forming a working air gap with the coil core and an end face of said coil at which said first flange is mounted;

an armature retaining spring having a first portion secured to said at least one male retaining member in the region of said end face in front of said bearing edge, a second portion of said armature retaining spring secured to said armature and a third portion extending into said contact chamber;

a protective cap over said coil and having a rib disposed against said second yoke leg in the region opposite said first flange and disposed against said first flange in overlapping fashion at lateral regions of said first flange.

4,684,911

WIDE ANGLE CONTROL OF PERMANENT MAGNET ROTORS

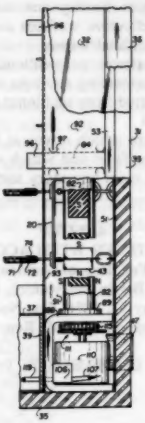
Edward C. Streeter, 89 Park Place, Park Parade, Harrogate, N. Yorkshire, England HG1 5NS

Filed Sep. 16, 1985, Ser. No. 776,601

Int. Cl.[4] H01F *7/02*

U.S. Cl. 335—288 **4 Claims**

1. Apparatus for simultaneously adjusting the angles of a series of permanent magnet rotors having parallel coplanar transversely spaced rotational axes, comprising means for mechanically linking each rotor to an adjacent rotor to form a plurality of rotor pairs having magnetic axes mutually perpendicular and perpendicular to said rotor axes of rotation, means for coupling each rotor to a direct magnetic control field component perpendicular to the plane common to rotor axes, and means for varying the amplitude ratio of adjacent field components coupled to the rotors of a linked pair according to



the tangent of a control angle to turn the pair of rotors through a corresponding angle.

4,684,912

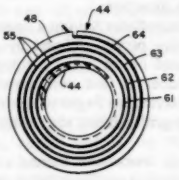
WINDING FORM FOR HIGH VOLTAGE TRANSFORMER

Ordean Kiltie, Fort Wayne, and Thomas C. Marrs, N. Manchester, both of Ind., assignors to Marshall Electric Corporation, Rochester, Ind.

Filed Jul. 9, 1986, Ser. No. 883,692

Int. Cl.[4] H01F *27/30*

U.S. Cl. 336—185 **5 Claims**



1. In an ignition system high voltage transformer having a ferromagnetic core and a primary coil surrounding a portion of the core and wrapped in helical fashion along a longitudinal axis, the improvement which comprises:

a tubular insulating winding form;

having partitions defining a plurality of annular coil chambers including central chambers and at least one end chamber;

said end chamber defining a spiral land;

a secondary coil wrapped on said form and including coil sections in each of said coil chambers;

the coil turns of said end chamber being positioned in a spiral configuration in the respective spiral land and having an inner end with a radius approximately that of the central chamber and increasing progressively in radius to the outer end thereof;

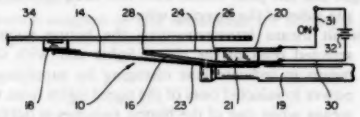
whereby successive turns of said end portion of said secondary coil located in said end chamber are axially and radially spaced from one another sufficiently to prevent arcing.

4,684,913

SLIDER LIFTER

John R. Yaeger, Sunnyvale, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Sep. 5, 1986, Ser. No. 905,082
Int. Cl.[4] H01H *85/04*
U.S. Cl. 337—140 **10 Claims**



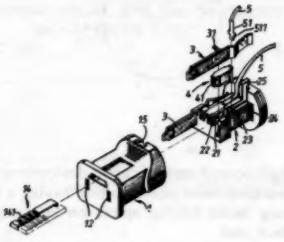
1. A slider lifter comprising:
a support structure;
a flexure arm and a resilient means cantilevered from said support structure; and
a shape memory alloy element operatively connected between said support structure and said resilient means, said shape memory alloy element having a martensitic condition and an austenitic condition;
said shape memory alloy element in one of the martensitic and austenitic conditions cooperating with said resilient means to elastically deform said flexure arm from an undeformed position to a deformed position;
said shape memory alloy element in the other of the martensitic and austenitic conditions cooperating with said resilient means to move away from said flexure arm, thereby allowing said flexure arm to return towards its undeformed position.

4,684,914

COMBINATION PLUG

Zei C. Wu, No. 53-2, Lin 8, Hsiang Shan Li, Hsin Chu City, Taiwan

Filed Oct. 16, 1986, Ser. No. 919,684
Int. Cl.[4] H01H *85/02*
U.S. Cl. 337—198 **1 Claim**



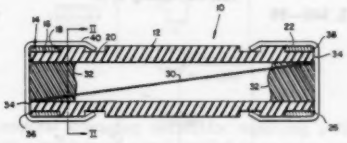
1. A combination plug comprising:
an outer housing; said outer housing comprising a sliding door with grooves, two prong holes, and a conduction wire inlet;
an insert housing; said insert housing comprising two prong slots, two fuse slots, two grooves, two insert walls, and a divider;
two prongs; each of said two prongs having a branch;
two fuse blocks; each of said two fuse blocks having a fuse thereon;
conduction wires; said conduction wires having conduction plates on an end thereof being inserted into said two fuse slots; said two fuse blocks being placed in each of said two fuse slots;
said sliding door being slideably insertable into said outer housing so as to provide a means for checking and maintaining said two fuses; said insert housing being slideably insertable in said outer housing with said prongs fitting through said prong holes; said conduction plates being electrically connected to said fuses, and said fuses being electrically connected to said branches.

4,684,915

THERMOPLASTIC INSULATING BARRIER FOR A FILLERLESS ELECTRIC FUSE

Edward J. Knapp, Jr., Merrimac, Mass., assignor to Gould Inc., Rolling Meadows, Ill.

Filed Dec. 30, 1985, Ser. No. 814,562
Int. Cl.[4] H01H *85/18, 85/38*
U.S. Cl. 337—276 **6 Claims**



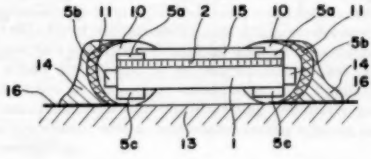
1. An electric fuse for interrupting relatively small currents in relatively high voltage circuits, which comprises:
a. a tubular casing having open ends;
b. a fusible element extending from one open end of said casing to the other open end thereof;
c. a pair of terminal caps, one of said caps permanently secured to and closing each of said open ends of said casing;
d. means for electrically conductively connecting the opposite ends of said fusible element to the respective terminal caps; and
e. a body of solid thermoplastic hot melt adhesive inside said casing, said body being introduced into said casing in a melted state and surrounding only a portion of the length of said fusible element, said body being in intimate sealing contact with the inner surface of said casing which is in close proximity to said portion of the length of said fusible element, to thereby establish an impermeable barrier within said casing between the respective terminal caps, whereby, when the fusible element melts, under all fuse operating conditions, said impermeable barrier prevents the arc plasma from extending between and feeding on the end terminals, thus promoting quick estinguishment of the arc.

4,684,916

CHIP RESISTOR

Juichiro Ozawa, Kyoto, Japan, assignor to Susumu Industrial Co., Ltd., Kyoto and Thin Film Technology Corporation, North Mankato, both of, Japan

Filed Mar. 11, 1986, Ser. No. 839,206
Claims priority, application Japan, Mar. 14, 1985, 60-52126
Int. Cl.[4] H01C *1/012*
U.S. Cl. 338—308 **6 Claims**



1. A chip resistor which comprises a chip resistor element formed on a substrate, printed circuit board circuit means for fixedly supporting the chip resistor element, connecting elec-

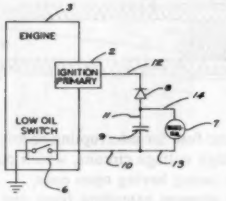
trode means formed on the chip resistor element, electrical conductive paint layer means formed covering the connecting electrode means, outer electrode means formed covering a portion of the electrical conductive paint layer means and soldering means coated between the outer electrode means and metallic pattern means formed on the printed circuit board means.

4,684,917

LOW OIL WARNING CIRCUIT

Paul A. Tharman, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed May 16, 1986, Ser. No. 863,791
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 340—59 **6 Claims**



1. In an apparatus such as a lawn mower, pump, generator, tractor and the like having an internal combustion engine including a crankcase containing oil and an ignition system having a main core that supports a primary winding to produce an ignition pulse, the improvement of an ignition-powered indicator system for indicating to an operator when the level of oil in the crankcase is too low, comprising:

indicator means connected in circuit with the primary winding and actuatable to indicate a low oil condition, said indicator means is an audio alterting device, and said indicator means further includes means for producing an intermittent sound from said audio device in timed relation to said primary winding ignition pulse; and

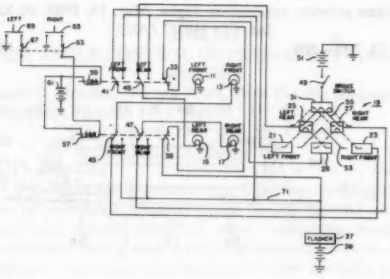
sensor switch means for sensing the amount of oil in the crankcase, said sensor switch means connected in circuit with said indicator means to actuate said indicator means in response to a change in the amount of oil in the crankcase indicative of an undesirably low oil condition.

4,684,918

LANE CHANGING SIGNALLING DEVICE

Allen C. Solomon, 3020 May St., Fort Worth, Tex. 76110

Continuation-in-part of Ser. No. 479,692, Mar. 28, 1983, abandoned. This application Nov. 5, 1985, Ser. No. 796,481
Int. Cl.[4] B60Q *1/26, 1/00*; G08G *1/00*
U.S. Cl. 340—73 **5 Claims**



1. In a motor vehicle having a steering wheel, a battery, flasher means connected to the battery for supplying pulsated power to turn signal switch means for connecting the pulsated power to selected signal lights, the turn signal switch means having a power contact connected to the flasher means, light contacts connected to selected turn signal lights, and a turn signal lever wiper that connects the power contact with selected ones of the light contacts when manually shifted, an improved signal means for indicating lane changing, comprising in combination:

right and left push button switches, each mounted to opposite sides of the steering wheel;

circuit means interconnecting the button switches with selected ones of the signal lights and with the flasher means to indicate lane changing by supplying pulsated power to selected ones of the signal lights from the flasher means when one of the button switches is depressed; and

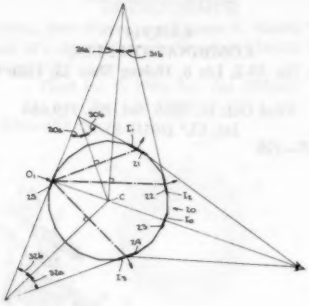
disabling means connected to the circuit means for automatically interrupting the connection between the flasher means and the power contact of the turn signal switch means when one of the button switches is depressed, so as to prevent the turn signal lever wiper from supplying pulsated power to one of the light contacts while pulsated power is simultaneously being supplied to one of the signal lights from the flasher means by the circuit means and one of the button switches.

4,684,919

LIGHT-SOURCE MULTIPLICATION DEVICE

Bachir Hihi, 1888 Peeler Rd., Dunwoody, Ga. 30338

Filed Oct. 9, 1985, Ser. No. 785,848
Int. Cl.[4] F21V *5/00, 5/02*
U.S. Cl. 340—84 **18 Claims**



1. A light-source multiplication device comprising:

a light-transmissive prism portion having a front and a rear having facets having apices on an imaginary spherical surface; and

at least one light source disposed at the rear of said light-transmissive portion outside and adjacent only a single one of said facets for transmitting light through said prism portion to form a visible image at a plurality of predetermined facets at the front of said light-transmissive portion and not visible at other predetermined facets.

4,684,920

REMOTELY CONTROLLED BYPASS FOR AUTOMATIC WATERING SYSTEM

Stuart L. Reiter, River Vale, N.J., assignor to United Water Resources, Inc., Harrington Park, N.J.

Filed Jan. 30, 1986, Ser. No. 824,268
Int. Cl.[4] H04M *11/04*; A01G *25/00*; B05B *12/08*
U.S. Cl. 340—310 A **13 Claims**

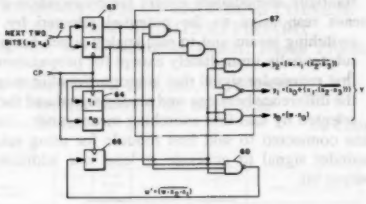
1. In an automatic irrigation system including a device for controlling periodic watering of a ground area by selectively delivering power to actuate a fluid valve, and a ground sensor

electrically connected to override said periodic watering device, apparatus for bypassing said ground sensor comprising:

a transmitter for receiving alternating current through said periodic device and for delivering power to a remote receiver;

said remote receiver including a first connection means for electrically connecting said receiver to said fluid valve through said ground sensor and a second connection means for electrically connecting said receiver directly to said fluid valve;

bypass means coupled to said transmitter for sensing a bypass signal to said transmitter;



said transmitter including converting means for converting alternating current received through said periodic device to pulsating direct current;

said converting means responsive to said bypass signal for converting said alternating current to direct current for a fixed time period; and,

said receiver including enabling means responsive to said direct current for enabling said second connection means to electrically connect said receiver directly to said fluid valve.

4,684,921

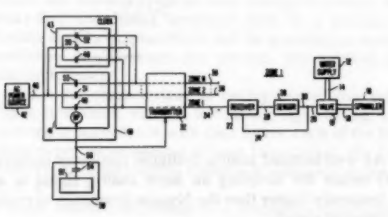
RLL (1,7) ENCODER WITH SINGLE STATE BIT

Wilson W. Fok, San Jose, and John P. Moussouris, Palo Alto, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 745,255, Jun. 13, 1985, abandoned. This application Jun. 23, 1986, Ser. No. 878,513

Int. Cl.[4] H03M 7/00

U.S. Cl. 340—347 DD **5 Claims**



5. An encoder responsive to a sequence of parallel bytes for producing, at a $\frac{8}{9}$ coding rate, a corresponding sequence of parallel RLL (1,7) symbols, comprising:

latch means for receiving, in parallel format, one of said consecutive bytes and two bits from the byte preceding said received byte;

register means for receiving a single state bit derived from encoding said preceding byte; and

gate array means connected to said latch and register means for generating a plurality of RLL (1,7)-encoded bits in response to said byte and said state bit in which at least one encoded bit is generated independently of said state bit, and further for producing a next state bit for use in generating another RLL (1,7) encoded symbol.

4,684,922

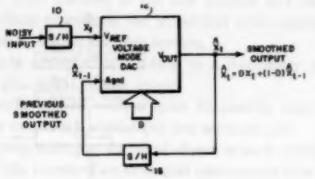
TEMPORAL AVERAGING USING A VOLTAGE MODE D/A CONVERTER

Paschal Minogue, Nenagh, Ireland, assignor to Analog Devices, Inc., Norwood, Mass.

Continuation of Ser. No. 819,244, Jan. 15, 1986, abandoned. This application Nov. 17, 1986, Ser. No. 931,910

Int. Cl.[4] H03M 1/66

U.S. Cl. 340—347 DA **4 Claims**



1. A temporal averaging circuit for supplying a filtered output from a noisy input signal applied to an input terminal thereof, comprising:

a. first and second sample-and-hold circuits;

b. a voltage-mode multiplying digital-to-analog converter (DAC) having an analog reference voltage input terminal, an analog ground terminal, an analog voltage output terminal and a digital code input port;

c. each of the sample-and-hold circuits having an input terminal, an output terminal and a terminal for receiving a sampling signal;

d. means for coupling a signal applied to the input terminal of the temporal averaging circuit from such input terminal to the input terminal of the first sample-and-hold circuit;

e. the output terminal of the first sample-and-hold circuit being connected to the analog reference voltage input terminal of the DAC;

f. the analog voltage output terminal of the DAC being connected to the input terminal of the second sample-and-hold circuit;

g. the output terminal of the second sample-and-hold circuit being connected to the analog ground terminal of the DAC; and

h. the filtered output of the circuit appearing at the analog output of the DAC.

4,684,923

ENCODER WITH SELECTIVE INDICATION OF COMPRESSION ENCODING AND DECODER THEREFOR

Toshio Koga, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Sep. 11, 1985, Ser. No. 774,648

Claims priority, application Japan, Sep. 17, 1984, 59-194108; Sep. 17, 1984, 59-194109; Sep. 28, 1984, 59-203223; Sep. 28, 1984, 59-203224

Int. Cl.[4] H03M 7/48

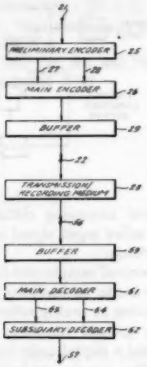
U.S. Cl. 340—347 DD **20 Claims**

1. An encoder for encoding an input sequence of signal elements organized in clusters and runs which alternatingly follow one another in said input sequence, said clusters being comprised of those of said signal elements which are deemed to be significant, said runs being comprised of those of said signal elements which are deemed to be insignificant in that they contain repetitive or redundant information, said significant elements associated with said clusters being selectively processable in accordance with a compression coding scheme, said encoder comprising:

mode signal producing means for producing a mode signal having a first mode for indicating that said significant signal elements of said clusters are not to be processed in accordance with said compression code scheme and a

second mode for indicating that said significant elements are to be processed in accordance with said compression code scheme;

first encoding means responsive to said mode signal for replacing at least one of said insignificant signal elements contained in a respective one of said runs with said mode signal for indicating the processing to be applied to the significant elements in the cluster next following said respective run;



second encoding means coupled to said mode signal producing means for converting each given one of said clusters into a succession of significant codes produced in accordance with said compression coding scheme but only if a portion of said mode signal associated with said given cluster is in its said second mode; and

third encoding means for generating for each of said runs a respective run length code which is indicative of the number of insignificant elements in said run being encoded.

4,684,924

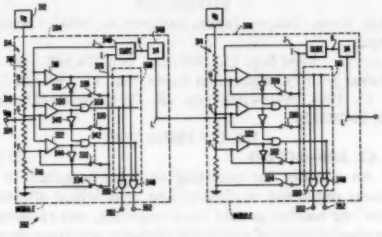
ANALOG/DIGITAL CONVERTER USING REMAINDER SIGNALS

Lawson A. Wood, 905 N. Frederick St., Arlington, Va. 22205

Filed Sep. 30, 1982, Ser. No. 429,198

Int. Cl.[4] H03M *1/14*

U.S. Cl. 340—347 AD **47 Claims**



1. An analog/digital converter for receiving an analog signal and converting it to parallel digital form, comprising:

a first ripple-through analog/digital module which includes

first biasing means for establishing at least three different first biasing potentials, said first biasing network means including at least one forward-biased semiconductor element,

first comparator means for comparing said at least three first biasing potentials and said analog signal, said first comparator means including at least three comparators each having one input responsive to said analog signal and another input responsive to a respective one of said at least three first biasing potentials,

first bit output means responsive to the output of said first comparator means for providing a pluralilty of parallel digital output bits from said first module, said first bit output means operating substantially immediately except for propagation delay,

first switching means responsive to the output of said first comparator means for selecting, from among said at least three first biasing potentials and ground potential, the largest potential that does not exceed the potential of said analog signal, said first switching means operating substantially immediately except for propagation delay, and

means responsive to the potential selected by said first switching means and to said analog signal for producing, substantially immediately except for propagation delay, a first remainder signal that is proportional in magnitude to the difference between said analog signal and the potential selected by said first switching means; and

means connected to said first module for using said first remainder signal to generate at least one additional digital output bit.

4,684,925

METHOD AND APPARATUS FOR CONVERTING AN ANALOG SIGNAL TO A DIGITAL SIGNAL USING AN OVERSAMPLING TECHNIQUE

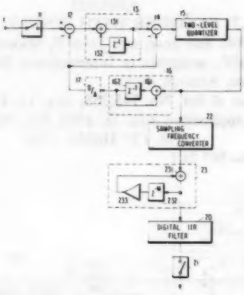
Rikio Maruta, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 5, 1985, Ser. No. 751,909

Claims priority, application Japan, Jul. 5, 1984, 59-139635; Jul. 18, 1984, 59-148920

Int. Cl.[4] H03M *3/00*

U.S. Cl. 340—347 AD **5 Claims**



2. An oversampled analog-to-digital converter comprising:

(A) means for sampling an input analog signal at a first frequency higher than the Nyquist frequency to produce a sampled signal;

(B) subtracting means for subtracting a local decoded signal from the sampled signal;

(C) quantizing means for quantizing the output of the subtracting means to produce a quantized binary signal having a first frequency;

(D) means for integrating the quantized binary signal to generate the local decoded signal;

(E) converting means for converting the quantized binary signal having the first frequency-reduced signal having a second frequency, said converting means further including:

(a) coefficient generating means for generating a plurality of coefficient groups each of which has a plurality of coefficients,

(b) processing means responsive to said quantized binary

signal for performing an addition or subtraction of each coefficient belonging to said each group of every group to produce a processed result for every group,

(c) accumulating means for accumulating the processed result for every group to produce an accumulated result for every group, and

(d) means for producing said frequency-reduced signal based on said accumulated result for every group; and

(F) integrating means for integrating the frequency-reduced signal at the second frequency to provide a converted digital signal.

4,684,926

UNIVERSAL SYSTEM OF ENCODING CHINESE CHARACTERS AND ITS KEYBOARD

Wang Yong-Min, c/o Computation Center, Henan Province, China

Filed May 14, 1984, Ser. No. 609,900
Int. Cl.[4] G06F *3/02*; B41V *5/00*
U.S. Cl. 340—365 R **30 Claims**

name of strokes	form of strokes	code names of strokes	key-code	direction of strokes	similar strokes
horizontal	—	1	G(11)	→	— - ˊ
vertical	|	2	H(21)	↓	| |]
left-falling	/	3	N(31)	↙	/ ˊ
right-falling	\	4	Y(41)	↘	\ ˋ
turning	ㄥ	5	T(51)	ㄥ	乙ㄥ丁ㄣ七

16. A method for encoding Chinese characters and phrases inputted from a keyboard, the keyboard being coupled with a screen, each of the phrases including at least two characters, each of the characters including at least one root, each of the roots including at least one stroke, each of the roots having a sequence within its respective character, and each of the strokes having a form and a sequence within its respective root, the sequences of roots and strokes being determined by the traditional sequence of Chinese handwriting, the method comprising:

(a) sensing depression of a plurality of actuations of keys, wherein the keyboard has at least twenty-five keys, the twenty-five keys being arranged both in a traditional Western alphabetic placement and in accordance with a breakdown of characters and phrases, the break-down being such that:

(i) strokes are characterized as having one of five basic types: horizontal, vertical, left-falling, right-falling, and turning, in accordance with their forms, each of the five basic types encompassing at least two strokes, the five basic types being allotted respective numerical codes 1, 2, 3, 4, and 5;

(ii) roots, selected according to a frequency distribution both in constituting characters and in practical usage, are classified into five sections, each root being classified according to a first one of the five basic types which characterizes a first stroke of the root, and each of the five basic types of strokes is also considered to be a root, the five sections being allotted respective numerical codes 1, 2, 3, 4, and 5;

(iii) each of the five sections is divided into five blocks, each of the five blocks being identified by one of:

A. a second one of the five basic types which characterizes a second stroke of each root; and

B. a number of strokes forming a root,

the five blocks of each of the five sections being allotted respective numerical codes 1, 2, 3, 4, and 5; and

(iv) characters are characterized as having one of four basic patterns: left-right, up-down, embracing, and singular, in accordance with relative locations of roots within each character, the four basic patterns being allotted respective numerical codes 1, 2, 3, and 4;

the keys corresponding to the break-down in such a way that each of the twenty-five keys corresponds to one of the blocks within one of the five sections, each of the twenty-five keys having a two-digit numerical code representing its location, one digit of which represents the numerical code allotted to the one section and another digit of which represents the numerical code allotted to the one block within the one section;

the keys being arranged according to a frequency of the blocks in practical Chinese usage;

each key being named with a most frequently used root within the one block within the one section; and

the keys corresponding to the break-down in such a way that twenty of the twenty-five keys also correspond to a combination of one of the five basic types with one of the four basic patterns, the two-digit numerical codes of the twenty keys also representing the combination, one digit of each two-digit numerical code being the numerical code allotted to the one of the five basic types and the other digit of each two-digit numerical code being the numerical code allotted to the one of the four basic patterns;

(b) encoding the characters and phrases in response to the plurality of actuations, whereby the characters and phrases are encoded in accordance with the break-down into the five basic types of strokes, the four basic patterns of characters, and the blocks of roots, wherein the encoding includes:

(i) encoding a character which is in itself a root and is used as a name of a key in response to actuation of the key four times in succession;

(ii) encoding a character which is in itself a root but is not used as a name of a key in response to actuation of the key and those keys which correspond to the first stroke, second stroke and last stroke of the character;

(iii) encoding a character having four roots in response to actuation of those keys which correspond to each root of the character;

(iv) encoding a character having more than four roots in response to actuation of those keys which correspond to the first three roots and the last root of the character;

(v) encoding a character having less than four roots in response to actuation of those keys which correspond to each root and then depression of one of the twenty keys;

(vi) encoding a phrase of two characters in response to actuation of those keys which correspond to the first two roots of each character;

(vii) encoding a phrase of three characters in response to actuation of those keys which correspond to the first root of each of the first two characters and the first two roots of the third character; and

(viii) encoding a phrase of at least four characters in response to actuation of those keys which correspond to the first root of each of the first three characters and the first root of the last character;

(c) displaying on a screen a line of a plurality of characters corresponding to the plurality of actuations when the plurality of actuations corresponds to more than one character, the displaying being in order of frequency of usage of the plurality of characters;

(d) encoding a first character in the line if there has been a displaying and if a shift key is not actuated; and

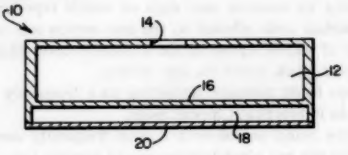
(e) encoding a later character in the line if there has been a displaying and if the shift key is actuated.

4,684,927

ANNUNCIATOR CIRCUIT FOR ELEVATOR SYSTEMS

Ely S. Zofan, and Marlin O. Thurston, both of Columbus, Ohio, assignors to Floyd Bell Associates, Inc., Columbus, Ohio

Filed May 20, 1986, Ser. No. 865,152
Int. Cl.[4] G08B *3/00*
U.S. Cl. 340—384 E **18 Claims**



1. An annunciator circuit for elevator systems wherein a piezoelectric crystal is energized to drive the diaphragm of a sounder selectively in response to two-bit logic low true input conditions, comprising:

input condition verification network means including first and second switching means respectively responsive to low logic conditions of first and second ones of said two-bit conditions only when said low true conditions are below a predetermined signal value with respect to ground to provide first and second unique verified low true signals;

drive means energizable from a source and coupled with said crystal for effecting the time limited, drive amplitude modulated energization thereof when enabled and oscillatively actuated;

oscillator means coupled with said drive means for effecting said actuation thereof when enabled from a disabled state;

first chime logic network means responsive to said first verified low true signal to derive a signal chime output condition serving to enable said drive means and said oscillator means for a singular interval of time;

second chime logic network means responsive to said second verified low true signal to derive said first logic network means single chime output condition and for deriving a double chime output condition serving to enable said drive means and said oscillator means after a predetermined interval of time subsequent to said derivation of said first logic network means single chime output condition;

third chime logic network means responsive to the simultaneous occurrence of said first and second verified low true signals for deriving said single chime output condition in a timed repetitive sequence.

4,684,928

MOTION SENSOR UNIT

Toshiaki Takahashi, and Tokio Suzuki, both of Iwaki, Japan, assignors to Alpine Electronics Inc., Japan

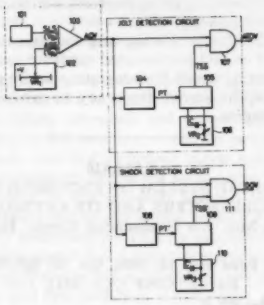
Filed Dec. 3, 1985, Ser. No. 804,157
Claims priority, application Japan, Dec. 3, 1984, 59-255287; Dec. 3, 1984, 59-255288
Int. Cl.[4] G08B *19/00*; H01H *35/02*
U.S. Cl. 340—521 **5 Claims**

1. A motion sensor unit for monitoring a mobile member such as a vehicle comprising:

a sensor assembly for outputting an inclination pulse signal indicating an inclination angle of the mobile member and a shock pulse signal indicating a shock applied to the mobile member;

a jolt detection circuit responsive to the output of an inclination pulse signal from said sensor assembly for detecting whether or not the duration of the inclination pulse signal exceeds a predetermined reference time and for outputting an inclination detection signal in response to such detection; and

a shock detection circuit responsive to the output of a shock pulse signal from said sensor assembly for detecting whether or not the frequency cycle of the shock pulse



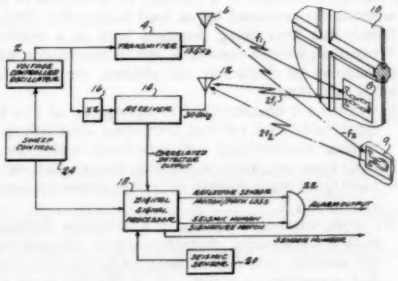
signal exceeds a predetermined reference frequency and for outputting a shock detection signal in response to such detection.

4,684,929

MICROWAVE/SEISMIC SECURITY SYSTEM

Carson P. Edwards; Martin A. Huisjen, and Robert E. Munson, all of Boulder, Colo., assignors to Ball Corporation, Muncie, Ind.

Filed Oct. 17, 1985, Ser. No. 788,482
Int. Cl.[4] G08B *13/00*
U.S. Cl. 340—541 **25 Claims**



1. A microwave/seismic security system comprising:

at least one microwave RF signal reflector;

at least one microwave RF signal interrogation means for transmitting microwave RF signals to said reflector and for receiving microwave signals reflected therefrom;

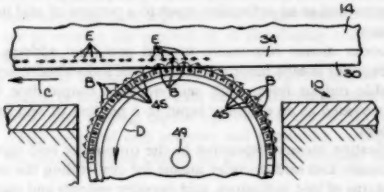
at least one seismic signal sensor; and

signal processing means conntected (a) to said interrogation means and (b) to said seismic signal sensor for generating an alarm in response to a predetermined relationship between expected microwave reflections and detected seismic signals.

4,684,930
METHOD AND APPARATUS FOR DEACTIVATING TARGETS USED IN ELECTROMAGNETIC TYPE ARTICLE SURVEILLANCE SYSTEMS

Arthur J. Minasy, Woodbury, and Peter A. Pokalsky, East Meadow, both of N.Y., assignors to Knogo Corporation, Hicksville, N.Y.

Filed Mar. 18, 1986, Ser. No. 840,904
Int. Cl.[4] G08B *13/24*
U.S. Cl. 340—551 16 Claims

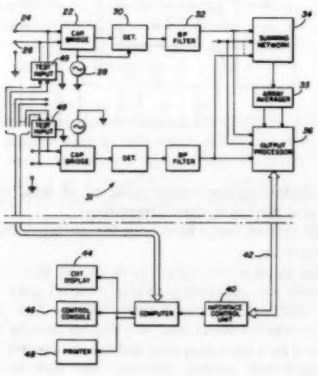


1. Apparatus for deactivating an electromagnetic article surveillance system target of the type comprising an elongated strip of magnetically soft, easily saturable magnetic material and an adjacent elongated strip of high coercivity, magnetically hard material, said apparatus comprising a solid element having a convexly curved outer surface and incorporating therein a plurality of permanent magnets arranged to produce in a plane adjacent said surface a pattern of variously directed magnetic fields such that along at least one given line in that plane, the magnetic fields are discontinuous, said curved outer surface of said solid element being rollable along a second surface and over a target affixed to said second surface.

4,684,931
CAPACITIVE SENSING SECURITY SYSTEM

Sydney Parks, 6016 Gorrion NW., Albuquerque, N. Mex. 87120

Filed May 14, 1985, Ser. No. 733,903
Int. Cl.[4] G08B *13/26*
U.S. Cl. 340—563 16 Claims

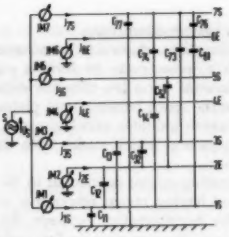


1. In a security system having a plurality of sensors arranged in an intrusion defining array, a plurality of separate signal input circuits respectively connected to at least two of the sensors, means connected to the input circuits for generating signals in response to uniform and localized disturbances of said sensors in the intrusion defining array, detector means connected to the signal generating means and the signal input circuits for producing a plurality of separate signal outputs that are directional functions of said disturbances and signal processing means operatively connected to the detector means for rejecting common mode signal components of the signal outputs caused by the uniform disturbances of the sensors to extract intrusion identifying data from the signal outputs.

4,684,932
METHOD AND ARRANGEMENT FOR MEASURING CHANGES OF CAPACITIVE STATE AT A SECURITY FENCE

Peter Kupec, Unterfoehring; Uwe Metzner, and Peer Thilo, both of Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 8, 1984, Ser. No. 638,765
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1983, 3329554
Int. Cl.[4] G08B *13/26*
U.S. Cl. 340—564 6 Claims



1. A method for detecting an alarm or malfunction condition at a security fence by measuring operating capacitance changes thereof, the security fence having a plurality of wire electrodes arranged in parallel, comprising steps of:

connecting at least one of the electrodes with an AC voltage so it serves as a transmit electrode and connecting at least one of the remaining electrodes as a receive electrode;

identifying for each transmit and receive electrode a standard operating capacitance and storing said standard operating capacitance;

measuring a respective current flow in each of the transmit and receive electrodes which is proportional to an operating capacitance of each of the transmit and receive electrodes and determining an operating capacitance for each of the transmit and receive electrodes, the operating capacitances being a function of a capacitance of the respective transmit or receive electrode to ground, a geometric size of the respective transmit or receive electrode, and its geometric spacing relative to the other electrodes;

repeatedly measuring the operating capacitance for every transmit electrode and every receive electrode and comparing the respective measured operating capacitance to the respective standard operating capacitance for each such electrode;

given a deviation in a respective operating capacitance compared to the respective standard operating capacitance

utilizing the respective operating capacitance to calculate actual electrode diameter and determining swelling in relation to electrode swellings of other of said plurality of wire electrodes,

utilizing the respective operating capacitance to obtain a variation of said measured operating capacitance with time and determining a rate of change of operating capacitance, and

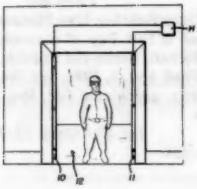
utilizing the respective operating capacitance to determine an absolute change of said variation of said respective operating capacitance with time; and

employing results from the determined electrode swelling, determined rate of change, and absolute change to decide whether or not an alarm or malfunction condition exits at said security fence.

4,684,933
UNAUTHORIZED PERSONNEL DETECTION SYSTEM

James M. Dill, Pompano Beach, Fla., assignor to Rita Ann Gray, Coral Springs, Fla.

Filed May 15, 1986, Ser. No. 863,304
Int. Cl.[4] G08B *13/26*
U.S. Cl. 340—572 8 Claims



1. A detection system comprising:

a pair of metallic plates adapted to be mounted on the opposite sides of a passageway to form a capacitor whose reactance depends upon the effective dielectric constant of what is in the space between said plates;

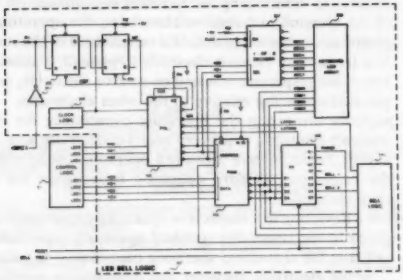
an oscillator which includes said capacitor, said oscillator having a frequency which varies with the reactance of said capacitor;

and a discriminating circuit connected to the output of said oscillator and having means responsive to the oscillator frequency for discriminating between the presence of a person's body without an electrically conductive article in said passageway between said plates and the presence of a person's body with an electrically conductive article in said passageway between said plates.

4,684,934
METHOD AND APPARATUS FOR STORING AND RETRIEVING KEYBOARD LED DATA

Larry A. Small, Austin, Tex., assignor to Data General Corporation, Westboro, Mass.

Filed Feb. 28, 1983, Ser. No. 470,697
Int. Cl.[4] G09G *3/00*
U.S. Cl. 340—712 4 Claims



1. Apparatus for controlling a plurality of indicators on a keyboard operatively connected to a terminal, said keyboard having a plurality of keys, means for sensing the status of each of said keys and means for providing key status information to said terminal and said terminal having means, responsive to said key status information, for generating on/off status information for said indicators and means for providing said on/off status information to said keyboard apparatus, said keyboard apparatus comprising:

clock means for generating at least one timing signal, said signal having evenly spaced timing pulses;

logic means responsive to said timing signal for providing an address selected from a plurality of addresses, said provided address changing in response to said timing pulses such that each of said plurality of addresses is repetitively cyclically provided by said logic means;

memory means having a plurality of memory output lines and having a plurality of storage locations for retaining said information descriptive of the on/off status of each of said indicators, said memory means being responsive to said provided address for providing portions of said status information at said memory output lines in response to said provided address, each said memory output line being provided as an activation input to a portion of said indicators;

decoder means responsive to said provided address, said decoder means having a plurality of individually activatable output lines, each said decoder output line being provided as an enabling input to a portion of said indicators;

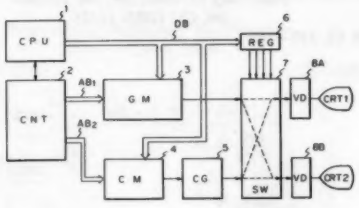
activation means responsive to the outputs of said memory means and said decoder means for controlling the on/off status of said indicators, said decoder outputs and memory outputs being connected to activate only a portion of said indicators at a time such that each indicator may be controlled independently; and

means, connected to said on/off status information providing means, for revising the information in said memory means.

4,684,935
COMBINED GRAPHIC AND TEXTUAL DISPLAY SYSTEM

Kiminori Fujisaku, Inagi; Makoto Awaga, Yokohama, and Shosuke Mori, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 17, 1983, Ser. No. 552,974
Claims priority, application Japan, Nov. 17, 1982, 57-201739
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—717 2 Claims



1. A display system connectable to at least two display devices, said display system comprising:

first and second image memories for storing first and second image data;

an input device, associated with the at least two display devices, for generating display control data controlling the selection and combination of the first and second image data for the at least two display devices, the display control data including first and second bits for each of the at least two display devices, the first bit indicating whether the first image data is to be displayed and the second bit indicating whether the second image data is to be displayed;

control means, comprising a register operatively connected to said input device to receive the display control data, for storing and outputting a control signal controlling selection and combination of the first and second image data for display on each of the at least two display devices; and

display selection and combination means, operatively connected to said first and second image memories, said register in said control means and the at least two display

devices, for selecting and combining the first and second image data in dependence upon the control signal, said display selection and combination means comprising signal mixing circuits, each operatively connected to said register, said first and second image memories and a corresponding one of the at least two display devices, each of said signal mixing circuits comprising:

a NAND gate having inputs operatively connected to said first image memory and to said register to receive the first bit of the display control data, and producing an output;

an AND gate having inputs operatively connected to said second image memory, said NAND gate and to said register to receive the second bit of the display control data, and producing an output;

an inverter having an input operatively connected to the output of said NAND gate and producing an output; and

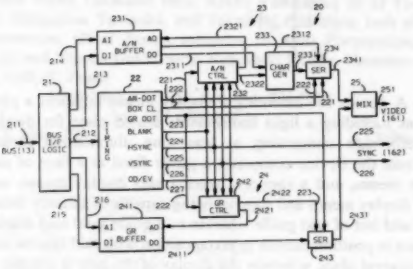
an OR gate having inputs operatively connected to said AND gate and said inverter and providing an output to the corresponding one of the at least two display devices.

4,684,936

DISPLAYS HAVING DIFFERENT RESOLUTIONS FOR ALPHANUMERIC AND GRAPHICS DATA

Mark W. Brown, and Robert E. Dubke, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 20, 1984, Ser. No. 602,314
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—721 **13 Claims**



1. A display unit for displaying simultaneous alphanumeric data and graphic data at different resolutions, comprising:

timing means for producing an alphanumeric timing signal establishing an alphanumeric dot duration, and for producing a graphic timing signal establishing a graphic dot duration, said duration having a fixed but non-integral ratio to each other;

alphanumeric generator means responsive to said alphanumeric dot duration for producing an alphanumeric signal from said alphanumeric data, said alphanumeric signal comprising a plurality of dot pulses each having said alphanumeric dot duration;

graphic generator means responsive to said graphic dot duration for producing a graphic signal froms aid graphic data, said graphic signal comprising a plurality of dot pulses each having said graphic dot duration;

mixing means for combining said alphanumeric signal with said graphic signal so as to produce a video signal representing both said alphanumeric data and said graphic data; and

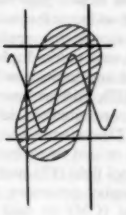
display means responsive to said video signal for producing a simultaneous image of both said alphanumeric data and said graphic data.

4,684,937

ENHANCED DATA DISPLAY SYSTEM

Jonathan M. Schine, 626 S. Hudson, Los Angeles, Calif. 90005

Filed Dec. 26, 1984, Ser. No. 686,219
Int. Cl.[4] G09G *1/06*
U.S. Cl. 340—728 **4 Claims**



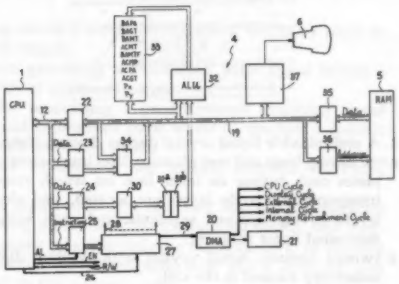
1. A method of enhancing the display of alphanumeric and other characters, including symbols of conventional and arbitrary form, on a cathode ray tube, wherein each character and symbol is formed by dots in a dot matrix of Mxn dot spaces utilizing in a character generator a matrix of Mxn binary digits for each character to be displayed with one binary digit for each dot space of the Mxn dot matrix, where M is the number of horizontal dot spaces in a row, and n is the number of rows of dot spaces in a matrix, and vertically modulating the cathode ray tube beam in a cyclic manner as it scans rasters for display of rows of dots in character spaces with one complete cycle per dot space and a phase of modulation that will place each dot within a dot space on a slope of the scan beam.

4,684,938

SYSTEM FOR DISPLAYING DATA ON A VIDEO SCREEN IN GRAPHICAL MODE

Gerard Chauvel, Cagnes/Mer, France, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 23, 1984, Ser. No. 583,072
Claims priority, application France, Feb. 25, 1983, 83 03142; Feb. 25, 1983, 83 03144
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—747 **21 Claims**



1. A system for displaying a graphical visual image on a video screen comprising:

a video display unit (6) including a video screen for displaying a graphical visual image;

a display control unit (37) connected to said video display unit (6) for receiving display control signals and controlling said video display unit in accordance with said received display control signals:

a page memory (5) for storing therein video information defining said graphical visual image to be displayed;

a central processing unit (1) connected to a single bus (12) upon which are transmitted address fields (14) and data fields (15) on a time shared basis and a control line (13) upon which is transmitted an assignment signal (CM); and

a video display processor (4) connected to said display control unit (37) and said page memory (5) for recalling video information stored in said page memory (5) and converting said recalled video information into corresponding display control signals for application to said display control unit (37), said video display processor (4) including an arithmetic and logical unit (32), a register, and a decoder circuit (27), said arithmetic and logical unit (32) and said register connected to said single bus (12), and said decoder circuit (27) connected to said single bus (12) but interpreting data or said single bus (12) as an address field (14) or as a control field (15), and to control the function of said video display processor (4) in response to said assignment signal (CM) on said control line (13), said decoder circuit (27) having a plurality of enabling outputs (28) for transmitting function signals to said arithmetic and logical unit (32) and to said register, enabling said video display processor (4) to execute data processing functions on a data field received on said single bus, said functions corresponding to said data received on said single bus (12) and interpreted as a control field (15) in response to said assignment signal (CM).

4,684,939

LIQUID CRYSTAL DISPLAY DEVICE

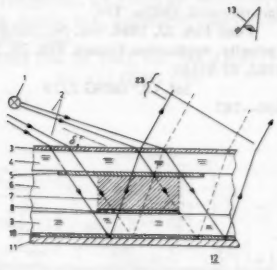
Peter Streit, Widen, Switzerland, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 23, 1983, Ser. No. 497,189

Claims priority, application Switzerland, Jun. 18, 1982, 3762/82

Int. Cl.⁴ G09G *3/36*

U.S. Cl. 340—784 **9 Claims**



1. A multiplexible liquid crystal display device, comprising:

a cell having front and rear plane-parallel transparent carrier plates each having an inner face on which respective transparent electrode layers are located, said electrode layers having opposed segments, and each having an associated linear polariser;

a twisted nematic liquid crystal with positive dielectric anisotropy located in the cell;

a light source arranged in a fixed spatial relationship to the cell for illuminating the display directly with obliquely incident quasiparallel light;

a diffusely scattering, metallic reflector disposed behind the rear carrier plate;

said light source disposed such that the angle of incidence of the light relative to the perpendicular to the surface of the front carrier plate is in the range from 50° to 90° such that the display is illuminated from that direction from which, with diffuse illumination, optimum contrast for an observer is achieved;

drive means for applying an effective operating voltage to selected electrode segments to switch on said selected electrode segments, wherein the effective operating voltage applied to the switched-on segments is less than 2.0 times the Freedericksz threshold voltage of the liquid crystal, and

a circuit having an optical sensor for switching off said light source as a function of the irradiance of the surrounding ambient light, and for increasing the operating voltage to at least 2.0 times the Freedericksz threshold voltage.

4,684,940

FASTENING DEVICE OF ELECTROLUMINESCENT DIODES ON A SEALED DISPLAY TABLE

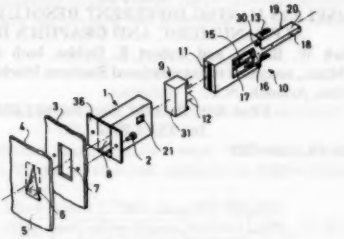
Gilbert Charmeux, Le Perreux-sur-Marne, France, assignor to Societe d'Etudes Techniques et d'Entreprises Generales, Paris, France

Filed Feb. 14, 1984, Ser. No. 580,105

Claims priority, application France, Feb. 18, 1983, 83 02722

Int. Cl.⁴ G09G *3/00*

U.S. Cl. 340—815.2 **9 Claims**



1. A device for mounting a display means adjacent a plate means including a light transmissive sealed plate for display therethrough comprising at least one illumination means, wherein the device comprises a guide fixed at a face of said plate means, and a support, bearing said display means, and said display means and support being capable of slidably fitting into and out of said guide wherein said guide hold said display device in position therein in juxtaposition with said face on said transparent plate, whereby the display of the data is capable of being conducted through said transparent plate without the seal of the plate to said guide being impaired when an illuminescent means is replaced on said display means.

4,684,941

METHOD OF COMMUNICATIONS BETWEEN REGISTER-MODELLED RADIO DEVICES

Paul F. Smith, Ft. Worth; Eric R. Schorman, Bedford, and Timothy M. Burke, Ft. Worth, all of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 21, 1984, Ser. No. 684,999

Int. Cl.⁴ H04Q *7/00*

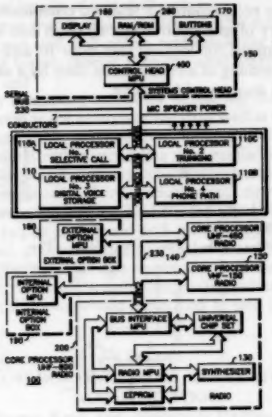
U.S. Cl. 340—825.52 **8 Claims**

1. A method of communicating information between a plurality of register-modelled processor means cooperatively operating within a radio device, comprising the steps of:

(a) generating, in any of the plurality of register-modelled processor means, an information packet having at least an operation code and an argument,

(b) transmitting, serially, said information packet to at least one of the plurality of register-modelled processor means over a serial communication link,

(c) receiving, serially, said information packet from said serial communications link,



(d) performing the operation designated by said operation code in cooperation with said argument.

4,684,942

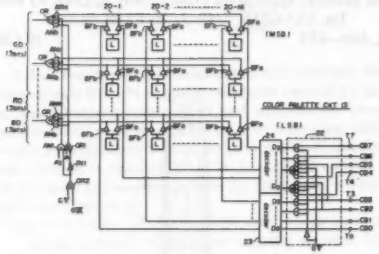
VIDEO DISPLAY CONTROLLER

Kazuhiko Nishi; Takatoshi Ishii; Ryozo Yamashita, all of Tokyo; Shigemitsu Yamaoka, and Takatoshi Okumura, both of Hamamatsu, all of Japan, assignors to Ascii Corporation, Tokyo and Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, both of, Japan

Filed May 22, 1985, Ser. No. 736,761

Int. Cl.[4] G09G *1/28*

U.S. Cl. 340—703 **4 Claims**



1. A video display controller adapted to be connected to a video display unit having a screen on which a plurality of display locations each for displaying a display element are provided and memory means for storing a plurality of color codes each for designating a color of a respective one of the display elements, said video display controller receiving the color codes read from the memory means, converting each of the received color codes into color data representative of color components of the color designated thereby and causing each of the display elements to be displayed in accordance with the color data to thereby display an image on the screen, said video display controller comprising:

signal generator means for generating a timing signal synchronized with the display timing of the display elements on the screen; and

converter means for converting each of the color codes read from the memory means into the corresponding color data, said converter means including:

a plurality of register means each for storing color data respective of color components which constitute one of predetermined colors;

selection circuit means having at least two input ports for respectively receiving at a time at least two of the color codes read from the memory means, said selection circuit means in respose to each of said received at least two color codes enabling one of said plurality of register means to output the color data contained therein; and

output control circuit means for being supplied with the color data outputted from those of said plurality of register means which are selected by said at least two color codes and responsive to said timing signal for outputting the supplied color data in a predetermined order in a multiplexed state.

4,684,943

UNLOCKING DEVICE FOR A VEHICLE LID

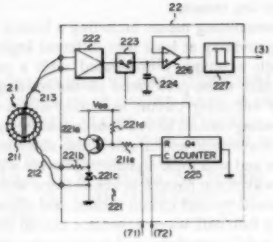
Sotoo Kitamura, Aichi; Shigeyuki Akita, Okazaki, and Yoshiyuki Kago, Aichi, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Continuation of Ser. No. 489,381, Apr. 28, 1983, abandoned. This application Jan. 27, 1986, Ser. No. 821,886

Claims priority, application Japan, Apr. 30, 1982, 57-71360

Int. Cl.[4] G08C *17/00*

U.S. Cl. 340—825.72 **8 Claims**



1. A device for unlocking a lid provided in a vehicle comprising:

unlockng actuator means for unlocking the lid by using an electric signal;

means for generating a transmitted pulse signal having a plurality of groups of pulses;

means for modulating a predetermined frequency signal with said transmitted pulse signal to produce a specific magnetic unlocking signal;

means for transmitting said specific magnetic unlocking signal;

magnetic sensor means for receiving said specific magnetic unlocking signal from the transmitting means, said magnetic sensor means including a magnetic core, an exciting coil wound on the magnetic core and a detection coil wound on the magnetic core;

signal processing means, responsive to said sensor means, for generating a received pulse signal having a plurality of groups of pulses;

controller means for receiving said received pulse signal from said signal processing means and generating a controller pulse signal when the number of pulses in any said group of pulses is within a predetermined range; and

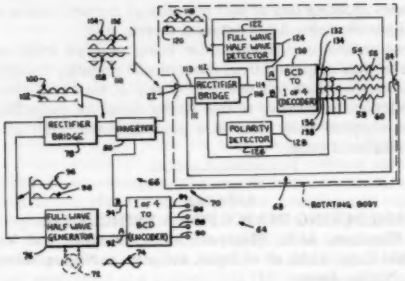
counter means for counting pulses in said controller pulse signal and generating said electric signal only when said counter means has counted in sequence a predetermined number of consecutive pulses indicative of an equivalent number of consecutive valid groups of pulses in said received pulse signal.

4,684,944

REMOTE CONTROL SYSTEM FOR ROTARY DEVICE

Jack H. Kerlin, Ann Arbor, Mich., assignor to Balance Dynamics Co., Ann Arbor, Mich.

Filed Mar. 22, 1984, Ser. No. 592,147
Int. Cl.[4] H04Q *1/00*
U.S. Cl. 340—825.06 **10 Claims**



1. A control system for providing remote control functions on a moving object from a stationary object comprising:

transmitting means on the stationary object,

receiving means on the moving object,

coupling means coupling said transmitting means and said receiving means,

said transmitting means including a binary encoding circuit for providing at least four different logic signals, each of which is uniquely correlated with a particular control function to be performed on the moving object, said binary encoding circuit including a one-of-four to BCD encoding circuit, an AC source which supplies a full wave AC waveform, and circuit means receiving said AC waveform and said logic signals to provide a particular electrical waveform pattern in accordance with the logic signal received by said circuit means, said circuit means including a full/half wave generator circuit receiving said full wave AC waveform and being under the control of said binary encoding circuit to provide either a full wave or half wave waveform, an inverter circuit also controlled by said binary encoding circuit, a rectifier bridge between said full/half wave generator circuit and said inverter circuit, said full/half wave generator circuit, said rectifier bridge, and said inverter circuit coating to provide four particular waveform patterns, each of which is correlated with a particular one of said logic signals, said four patterns being, a full wave rectified positive pattern, a half wave rectified positive pattern, a full wave rectified negative pattern, and a half wave rectified negative pattern, and

said receiving means comprising means for detecting the particular pattern of the waveform which it receives from said transmitting means via said coupling means, and for causing at least a portion of the energy from such receiving waveform to be applied to perform the corresponding control function on the moving object.

4,684,945

ELECTRONIC LOCK WITH SECURE BACKDOOR ACCESS

Hugh B. Sanderford, Jr., New Orleans, La., assignor to DDRS, Inc., Metarie, La.

Filed May 14, 1985, Ser. No. 733,966
Int. Cl.[4] E05B *49/00*; H04Q *9/00*
U.S. Cl. 340—825.56 **19 Claims**

1. An electronic safe comprising:

a secure housing including a lockable door thereto,

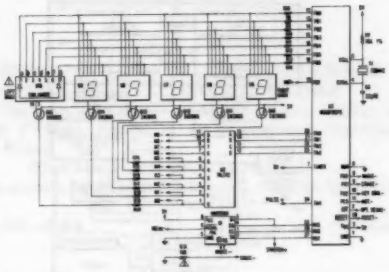
a programmable control unit within said housing,

a main power source for actuating the functions of said safe,

a keyboard mounted on an external side of said housing and connected to said control unit,

means for programming a selected combination code into a memory of said control unit through said keyboard,

locking means for locking said door to said housing upon programming of a combination code by a user and closing of said door to said housing,



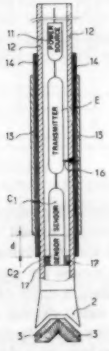
means for recognizing entry on said keyboard of said selected combination code to release said locking means to permit access into said safe, and means for overriding said selected combination code including electronic means for generating an alternate code, electronic means for deriving an override code corresponding to said alternate code, and means in said control unit for recognizing entry of said override code and unlocking the safe.

4,684,946

DEVICE FOR TRANSMITTING TO THE SURFACE THE SIGNAL FROM A TRANSMITTER LOCATED AT A GREAT DEPTH

Olivier Issenmann, Lamorlaye, France, assignor to Geoservices, Le Blanc Mesnil, France

Filed Apr. 23, 1984, Ser. No. 602,724
Claims priority, application France, May 6, 1983, 83 07652
Int. Cl.[4] G01V *1/40, 3/18*; E21B *49/00*
U.S. Cl. 340—855 **10 Claims**



1. A device for transmitting signals from a transmitter at the bottom of a drill well to the earth's surface including means for transmitting signals from the transmitter at the bottom of the drill well to the earth's surface, said means comprising:

a drill collar which extends in an axial direction;

said transmitter disposed in said drill collar;

a cylindrical metal sleeve for forming part of an antenna for electromagnetic wave transmission, said cylindrical metal

sleeve being disposed around said drill collar and connected electrically to said transmitter, said cylindrical metal sleeve having a diameter greater than the diameter of said drill collar and having an axial length shorter than the axial length of said drill collar;

an insulating sheath disposed between said cylindrical metal sleeve and said drill collar, said insulating sheath having an axial length shorter than the axial length of said drill collar; and

resistivity measuring means for measuring the resistivity of the terrain at the bottom of the drill well in the vicinity of said transmitter, said resistivity measuring means comprising a metal ring surrounding said insulating sheath, said metal ring having an axial length which is shorter than the axial length of said cylindrical metal sleeve, said metal ring being disposed axially between said cylindrical metal sleeve and an end of said drill collar to which a drill bit is attached, said cylindrical metal sleeve and said metal ring being connected to said transmitter by connection means for selectively electrically connecting either said cylindrical metal sleeve or said metal ring to said transmitter.

4,684,947

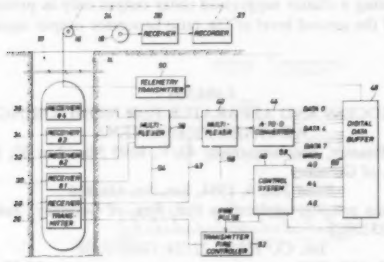
SIMULTANEOUS DIGITIZING APPARATUS FOR AN ACOUSTIC TOOL

Mark D. Zimmer, Katy, Tex., assignor to Halliburton Company, Duncan, Okla.

Continuation of Ser. No. 530,283, Sep. 8, 1983, abandoned. This application Jun. 2, 1986, Ser. No. 869,790

Int. Cl.[4] G01V *1/40, 1/16*

U.S. Cl. 340—858 **12 Claims**



1. For use in a well borehole to obtain multiple simultaneous data signals from N acoustic receivers carried by an elongated acoustic logging sonde sized and adapted for passage in the well borehole and suspended by a well logging cable having a single acoustic data conductor, the multiple simultaneous signals formed in response to a single acoustic energy pulse from an acoustic transmitter carried by the sonde, a data collection system comprising:

(a) N acoustic receivers supported by an acoustic logging sonde forming N time overlapping acoustic logging output signals from the receivers where N is an integer;

(b) first multiplexing means having N inputs connected to the outputs of said N acoustic receivers;

(c) second multiplexing means connected to said first multiplexing means;

(d) digital converter means operating at a first rate and connected to said second multiplexing means for forming a time based series of digital words representative of the output signals of said N receivers;

(e) digital data buffer means in said sonde and connected to said digital converter means for recording in a formatted order a series of digital words from said converter means;

(f) an acoustic transmitter monitor means for monitoring acoustic transmitter pulses transmitted by the acoustic transmitter and supplying the monitored transmitter pulses to said second multiplexing means;

(g) control means connected to said first and second multiplexing means for controlling operation of said first and second multiplexing means to form a series of digital words representative of;

(1) the monitored transmitter pulses from said acoustic transmitter monitor, and

(2) the N acoustic logging output signals;

(h) timing means incorporated with said control means to time digitizing by said digital converter means to operate both said first and second multiplexing means to form:

(1) a first series of digital words representing the monitored transmitter pulses; and

(2) a second and later series of digital words representing the N acoustic logging output signals; and

(i) telemetry transmitting means for telemetering the first and second series of digital words from said buffer means along the single acoustic data conductor in the cable at a second rate which rate is less than the first rate such that a single acoustic energy pulse from said acoustic transmitter generates N digital representations of the acoustic energy received at said N acoustic receivers corresponding to the arrival at each receiver of a single acoustic energy pulse.

4,684,948

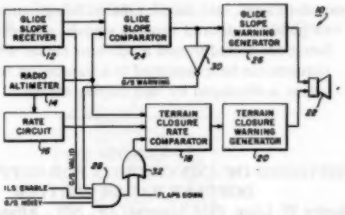
GROUND PROXIMITY WARNING SYSTEM HAVING MODIFIED TERRAIN CLOSURE RATE WARNING ON GLIDE SLOPE APPROACH

Charles D. Bateman, Bellevue, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Jul. 8, 1983, Ser. No. 512,208

Int. Cl.[4] G08B *23/00;* **G05D** *1/06*

U.S. Cl. 340—970 **19 Claims**



1. A ground proximity warning system for an aircraft comprising:

means responsive to a signal representative of the altitude of the aircraft above ground and to a signal representative of the terrain closure rate of the aircraft for generating a first signal when the terrain closure rate is within a predetermined envelope for the altitude at which the aircraft is flying;

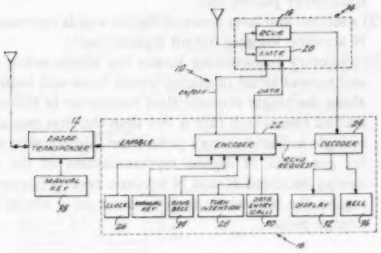
means responsive to a glid slope radio beam for generating a second signal if the aircraft deviates by more than a predetermined limit from the glide slope; and

means for altering said predetermined envelope according to a predetermined relationship between the closure rate and the altitude of the aircraft above ground when said glide slope is detected and said aircraft has not deviated more than the predetermined limit from said glide slope.

4,684,949
VHF/RADAR TRANSPONDER COLLISION AVOIDANCE AID

Rudolph M. Kalafus, Newton, Mass., assignor to The United States of America as represented by the Secretary of Transportation, Washington, D.C.

Filed Jan. 17, 1983, Ser. No. 458,728
Int. Cl.[4] G01S *13/93*
U.S. Cl. 342—41 **8 Claims**

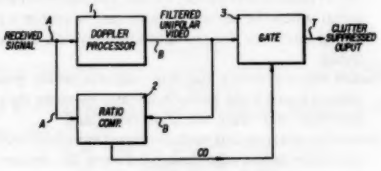


1. A communications system comprising:
radar transponder means;
radio transceiver means comprising a VHF radiotelephone; and
means operatively coupling said transponder and transceiver means, said coupling means comprising:
clock means, said clock means generating timing signals;
means responsive to said clock means generated timing signals for periodically enabling said transponder means and said transceiver means;
modulator means, said modulator means delivering a coded identification signal to said transceiver means for transmission upon the enabling thereof;
decoder means, said decoder means demodulating coded information bearing signals received by said transceiver means;
display means connected to said decoder means for displaying identification information received by said transceiver means; and
encoder means, said encoder means being manually operable to generate desired request signals, said encoder means being connected to said modulator means whereby coded requests can be transmitted to a transceiver whose identification is displayed by said display means.

4,684,950
METHODS OF AND CIRCUITS FOR SUPPRESSING DOPPLER RADAR CLUTTER

Maurice W. Long, 1036 Somerset Dr., NW., Atlanta, Ga. 30327

Filed Jul. 20, 1984, Ser. No. 633,056
The portion of the term of this patent subsequent to Jul. 10, 2001, has been disclaimed.
Int. Cl.[4] G01S *13/52*
U.S. Cl. 342—94 **17 Claims**

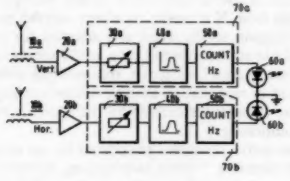


1. A radar clutter suppressor comprising:
radar transmitting means for transmitting pulsed radar waves;
receiving means for receiving radar echoes of the pulsed radar waves and for providing a received signal with doppler frequency components in response to the radar echoes;
doppler processor means for frequency filtering this received signal and for providing a filtered signal in response to the received signal;
means of providing a first signal with a magnitude proportional to the magnitude of the received signal;
means of providing a second signal with a magnitude proportional to the magnitude of the filtered signal;
ratio processor means including comparator means, reference level means and logic circuit means wherein said ratio processor means compares the magnitude of the first and second signals and provides a ratio processor output signal of a first level when ratio of magnitudes of the first signal to the second signal exceeds a first ratio value or when the ratio of magnitudes exceeds a second ratio value which is less than the first ratio value if the magnitude of the first signal is within a predetermined range of levels and provides a ratio processor output signal of a second level when the ratio of magnitudes is less than the second ratio value less than the first ratio value or when the magnitude of the first signal is outside the predetermined range of levels and the ratio of magnitudes is less than the first ratio value; and
radar output means responsive to the ratio processor output signal for selectively passing a radar output signal constituting a clutter suppressed radar output only in presence of the second level of the ratio processor output signal.

4,684,951
PROCESS AND APPARATUS FOR MONITORING WEATHER PHENOMENA

Hans Baumer, Buschingstrasse 43/V, 8000 Munchen 80, Fed. Rep. of Germany

Filed Jun. 4, 1984, Ser. No. 616,816
Claims priority, application Fed. Rep. of Germany, Jun. 9, 1983, 3320908
Int. Cl.[4] H01Q *21/24;* G01S *3/02*
U.S. Cl. 342—362 **22 Claims**



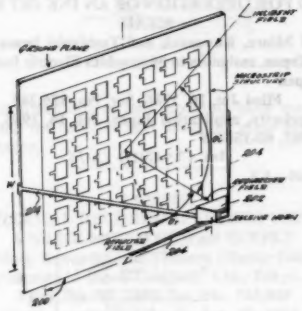
1. A process for the monitoring of weather phenomena by means of analysis of movements of air masses whereby said movements are determined by
(a) receiving the EM radiation generated in the atmosphere in the frequency range between 3kHz and 100kHz by means of at least one directionally selective VLF receiving antenna installation,
(b) splitting said radiation into essentially two noncontiguous frequency bands,
(c) determining separately the atmospheric event frequencies occurring within said frequency bands,
(d) comparing these event frequencies with each other, and
(e) displaying the result using at least two indication levels indicating the presence of said atmospheric event frequencies.

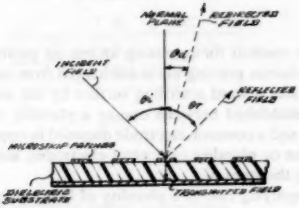
4,684,952

MICROSTRIP REFLECTARRAY FOR SATELLITE COMMUNICATION AND RADAR CROSS-SECTION ENHANCEMENT OR REDUCTION

Robert E. Munson; Hussain A. Haddad, and John W. Hanlen, all of Boulder, Colo., assignors to Ball Corporation, Muncie, Ind.

Filed Sep. 24, 1982, Ser. No. 423,307
Int. Cl.[4] H01Q 1/38
U.S. Cl. 343—700 MS 38 Claims





1. A reflectarray of passive microstrip antenna radiators comprising:

an electriclally conducted reference surface;

an array of resonantly-dimensioned electrically conducting passive microstrip antenna radiator elements spaced less than one-tenth wavelength at the intended antenna operating frequency above said reference surface;

each of said radiator elements defining a resonant cavity between it and the underlying reference surface and also defining at least one radiation slot between at least one edge of the radiator element and the underlying reference surface, said slot coupling r.f. energy to/from said element and the resonant cavity at the intended antenna operating frequency; and

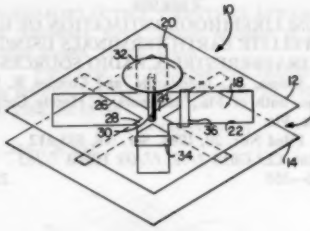
a plurality of individual phase-controlling passive transmission line means, each being coupled to a respective individual one of said radiator elements and having predetermined respective length and terminating impedance of a short or open circuit so as to cause the overall array to receive an incident r.f. electromagnetic field, to convert the received field into r.f. electrical currents which flow along said transmission line means and to re-transmit in a predetermined direction a re-directed r.f. electromagnetic field in response to substantially complete reflection of r.f. electrical currents from the terminations of said transmission line means.

4,684,953

REDUCED HEIGHT MONOPOLE/CROSSED SLOT ANTENNA

Edward A. Hall, St. Louis, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.

Continuation-in-part of Ser. No. 569,265, Jan. 9, 1984, Pat. No. 4,587,524. This application Mar. 15, 1985, Ser. No. 712,157
Int. Cl.[4] H01Q 21/00
U.S. Cl. 343—725 12 Claims



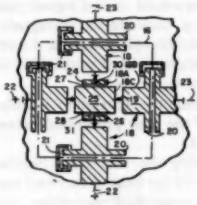
7. A monopole/slot antenna having generally parallel spaced ground planes, the upper one of which having a slot therein, a stripline located between the ground planes generally parallel thereto and off-set toward the slotted ground plane, and a monopole conductively connected to and extending from the stripline and through said slot generally orthogonally to the upper ground plane and being top hat loaded at the outer end thereof, said slot having first and second generally rectangular slot portions, one intersecting with the other, said stripline having first and second stripline portions, one conductively intersecting with the other, and means for feeding the stripline at selected ends thereof.

4,684,954

ELECTROMAGNETIC ENERGY SHIELD

Jean-Claude Sureau, Boston, and Steven S. Krystofik, Hudson, both of Mass., assignors to Radant Technologies, Inc., Stow, Mass.

Filed Aug. 19, 1985, Ser. No. 766,545
Int. Cl.[4] H01Q 15/02
U.S. Cl. 343—909 13 Claims



1. A structure for preventing the transmission of electromagnetic energy within a selected frequency range and for permitting the transmission of electromagnetic energy outside said frequency range during a first mode of operation and for permitting the transmission of electromagnetic energy over a relatively wide frequency range including said selected frequency range during a second mode of operation, said structure comprising

an insulative member,

a plurality of regions containing conductive elements positioned in a symmetrical array on at least one surface of said structure, portions of the conductive elements in each region being interconnected by diode elements;

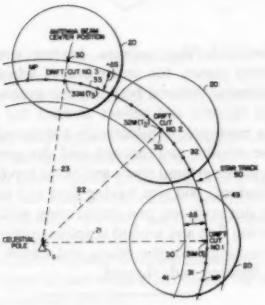
means for placing said diode elements in their conductive state in a first diode mode of operation to permit the transmission of electromagnetic energy over said relatively wide frequency range and for placing said diode elements in their non-conductive state in a second diode mode of operation to prevent the transmission of electromagnetic energy in said selected frequency range and to permit the transmission of electromagnetic energy outside said selected frequency range.

4,684,955

MAXIMUM LIKELIHOOD ESTIMATION OF G/T OF SATELLITE EARTH TERMINALS USING EXTRATERRESTRIAL RADIO SOURCES

William C. Adams, Jr., Indialantic, and Charles R. Patisaul, Melbourne, both of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Nov. 20, 1984, Ser. No. 673,412
Int. Cl.[4] G01S *3/02, 17/00;* H04B *7/185*
U.S. Cl. 342—351 **22 Claims**



1. For use in a communication system, a method of generating an indication from which the figure of merit of receiver equipment employed by said system may be derived comprising the steps of:

(a) directing a signal gathering element of said receiver equipment along the track of a remote signal source and measuring the level of signals received at successive instances in time so a to produce therefrom a matrix of signal level measurements as encompassed by the signal gathering aperture of said signal gathering element;

(b) processing said matrix of signal level measurements produced in step (a) to obtain a matrix of prescribed parameter values arrayed within the beam aperture of said signal gathering elements;

(c) determining the maximum likelihood estimate of the position of the peak prescribed parameter value with said matrix; and

(d) determining the maximum likelihood estimate of the magnitude of the peak prescribed parameter value of said matrix of prescribed parameter values based upon the maximum likelihood estimate of the position of the peak prescribed parameter value determined in step (c).

4,684,956

METHOD FOR APPLYING A HOT MELT INK TO A SUBSTRATE

Jeffrey M. Ball, Manchester, England, assignor to Willett International Limited, Slough, England

Filed May 10, 1985, Ser. No. 732,833
Int. Cl.[4] G01D *9/00, 15/16;* B41J *3/20;* C09D *11/00*
U.S. Cl. 346—1.1 **15 Claims**

1. A process for applying a thermoplastic composition to a substrate, comprising the steps of:

moving the substrate past an application station at which is located a non-contact ink jet printing apparatus;

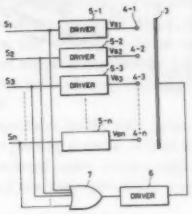
operating the non-contact ink jet printing apparatus to apply the composition to the moving substrate as a series of discrete droplets, the composition being applied at a temperature in the range from 100° to 160° C., the composition being characterized as being thermally stable at the temperature of application and having a viscosity of from 2 to 20 Centipoise at the temperature of application.

4,684,957

METHOD FOR OPERATION OF AN INK JET PRINTING HEAD

Masayoshi Miura, Kawasaki, and Toshiyuki Iwasawa, Tokyo, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jul. 16, 1986, Ser. No. 886,245
Claims priority, application Japan, Jul. 16, 1985, 60-156428; Jul. 16, 1985, 60-156429
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—1.1 **13 Claims**



1. A method for operating an ink jet printing head of the type wherein printing ink is discharged from one or a plurality of nozzles toward a writing surface by the aid of an electric field established between one or a plurality of control electrodes and a common electrode disposed in opposed relation to said one or plurality of control electrodes, said method comprising the steps of:

(a) applying one or a plurality of first pulses to said one or plurality of control electrodes in response to one or a plurality of picture element signals; and

(b) applying a second pulse to said common electrode only when printing ink is discharged in response to the application of said one or plurality of first pulses thereto.

4,684,958

SEISMIC DISPLACEMENT RECORDER FOR BASE-ISOLATED STRUCTURES

Paul D. Engdahl, 2850 Monterey Ave., Costa Mesa, Calif. 92626, and Roger P. Engdahl, Santa Ana, Calif., assignors to Paul D. Engdahl, Costa Mesa, Calif.

Filed Apr. 3, 1986, Ser. No. 847,661
Int. Cl.[4] G01D *9/00, 15/02;* G01M *1/00, 5/00*
U.S. Cl. 346—7 **10 Claims**

1. In a base-isolated structure having a separated base and foundation with a space therebetween,

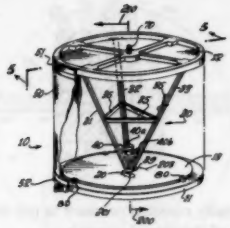
a seismic instrument mountable in said space for recording relative displacements between said base and foundation and comprising:

a first mounting plate means and a rigid arm means mounted thereon and extending outwardly therefrom;

a marking stylus means on the end portion of said arm means;

a second mounting plate means with a record plate fastened to its surface and extending generally parallel and opposite to said first mounting plate means,

said stylus means being engageable in marking relation with said record plate; and



means to attach one of said mounting plate means to said base and the other of said mounting plate means to said foundation.

4,684,959

THERMAL RECORDING SYSTEM USING UNREGULATED POWER SUPPLY

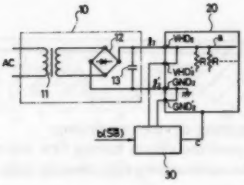
Masaaki Mori, Kawasaki, and Chiharu Okada, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 18, 1985, Ser. No. 745,908

Claims priority, application Japan, Jun. 20, 1984, 59-127226

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH **7 Claims**



1. A thermal recording system comprising:

a thermal print head including a plurality of heat-producing elements arranged in the form of an array, said plurality of heat-producing elements being selectively activated in accordance with an activation pulse supplied thereto, said thermal print heat including a common connection line to which one end of each of said plurality of heat-producing elements is commonly connected, a first detection terminal connected to said common connection line, and a second detection terminal connected to a reference potential;

a power supply connected to said thermal print head so as to apply a power supply voltage to at least one of said plurality of heat-producing elements for activation thereof; and

control means connected to said thermal print head for controlling the duration of said activation pulse so as to keep the activation energy applied to said plurality of heat-producing elements substantially constant while monitoring the voltage across said plurality of heat-producing elements, wherein said control means is connected to said first and second detection terminals to detect a voltage which is substantially equal to the voltage actually applied across said plurality of heat-producing elements, said controlling means including a pair of first and second resistors which are connected in series between said first and second detection terminals, a diode having an anode connected to the interconnection between said first and second resistors and a cathode which is connected to ground through a third resistor, integrating means having an integrator input terminal connected to said cathode and an integrator output terminal, a comparator having a first input terminal connected to said integrator output, a second input terminal connected to a reference voltage and an output terminal, and a flip-flop having a first input terminal connected to said output terminal of said comparator, a second input terminal for receiving said activation pulse and an output terminal for supplying said pulse width-controlled activation pulse.

4,684,960

THERMOELECTRIC PRINTING APPARATUS

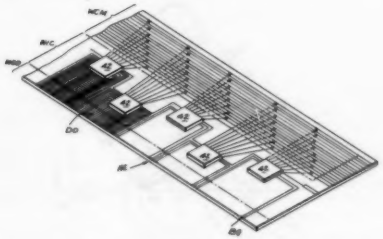
Tsutomu Nishiwaki, Suwa, Japan, assignor to Seiko Epson Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1985, Ser. No. 715,555

Claims priority, application Japan, Mar. 23, 1984, 59-55735; Mar. 23, 1984, 59-55736

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH **86 Claims**



1. A printing apparatus for use with an electrothermal transfer film having a resistive layer and an ink layer which responds to heat produced by the passage of electric current through the resistive layer to transfer fusible ink to a recording body, the printing apparatus comprising:

print head means comprising a substrate carrying a plurality of recording electrodes; and

means for pressing the end surfaces of the recording electrodes into contact with the resistive layer of the electrothermal transfer film at an acute angle.

4,684,961

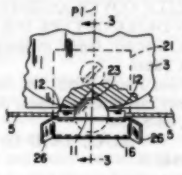
DETACHABLE FACSIMILE PRINT HEAD DRIVE

Kestutis E. Bliudnikas, North Grafton, Mass., assignor to Alden Research Foundation, Brockton, Mass.

Filed Jun. 2, 1986, Ser. No. 869,567

Int. Cl.[4] H04N *1/14*; B41J *19/00*

U.S. Cl. 346—139 A **10 Claims**



1. Apparatus for graphic recording of electric signals on a sheet comprising:

a print head traversing the sheet and marking the signals on the sheet;

a cable for driving the head on its traverse; and

means detachably coupling the cable to the head including a rounded body attached to the cable and a spring detent on the print head having seating surfaces yieldingly pressing

the body against the head and engaging the body so as to allow automatic disengagement and reengagement of the body and detent lengthwise of the cable by relative movement of the head and cable and to allow rotation of the ball body in the detent as the cable twists about its axis.

4,684,962

INK TUBE CONNECTING SYSTEM IN A LIQUID JET RECORDING APPARATUS

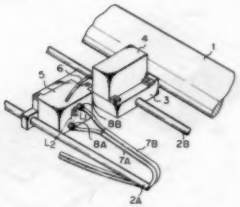
Toshiaki Hirosawa; Yoshie Akiyama, both of Hiratsuka; Isao Ebisawa, Tokyo; Yoshifumi Hattori, Yamato, and Tsutomu Abe, Isehara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1985, Ser. No. 812,068

Claims priority, application Japan, Dec. 28, 1984, 59-200486[U]

Int. Cl.⁴ G01D *15/18*

U.S. Cl. 346—140 R **12 Claims**



5. A liquid jet recording apparatus provided with an ink jet recording head unit arranged for operating in a scanning movement, an ink tank for storing therein liquid to be supplied to said ink jet recording head unit, an ink tube communicating said ink jet recording head unit with said ink tank, and an ink tube for discharging the gas and/or liquid in said ink jet recording head unit, wherein said ink tubes are integrally attached together in parallel for at least a portion thereof, the ends of said ink tubes being separated, and the integral, parallel portion of said ink tubes extending along a direction generally parallel to the direction of scanning of said ink jet recording head unit, and wherein said ink tubes are connected to said ink jet recording head unit so that a plane containing one of said ink tubes at its connection with said recording head unit and both of said ink tubes and another plane containing the other of said ink tubes its connection with said recording head unit and both of said ink tubes do not perpendicularly intersect each other.

4,684,963

NOZZLE COVER ASSEMBLY FOR AN INK-ON-DEMAND TYPE INK JET PRINTER

Takahiro Naka, Shiojiri, Japan, assignor to Seiko Epson Kabushiki Kaisha, Japan

Filed Jun. 7, 1985, Ser. No. 742,503

Claims priority, application Japan, Jun. 8, 1984, 59-117712; Mar. 15, 1985, 60-53054

Int. Cl.⁴ G01D *15/18*

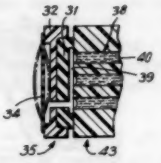
U.S. Cl. 346—140 R **23 Claims**

1. An ink-on-demand type ink jet printer comprising:

a print head formed with at least one nozzle for ejecting ink;

a nozzle cover for selectively covering said at least one nozzle, said cover formed with a recess on one side in order to form a nozzle chamber between said cover and said at least one nozzle of said print head when said nozzle cover covers said at least one nozzle; and

a pressure maintaining means communicating with the nozzle chamber for maintaining substantially constant pressure in the chamber and defining a closed volume with the nozzle chamber when the nozzle cover covers the at least one nozzle, said pressure maintaining means maintaining



substantially constant pressure in the chamber by varying the size of the closed volume.

4,684,964

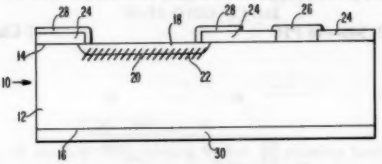
SILICON LIGHT EMITTING DEVICE AND A METHOD OF MAKING THE DEVICE

Jacques I. Pankove, Boulder, Colo., and Chung P. Wu, Trenton, N.J., assignors to RCA Corporation, Princeton, N.J.

Continuation of Ser. No. 195,182, Oct. 8, 1980, abandoned. This application Dec. 1, 1986, Ser. No. 936,987

Int. Cl.⁴ H01L *45/00, 33/00, 29/04, 29/34*

U.S. Cl. 357—17 **2 Claims**



1. A light emitting device comprising:

a body of crystalline silicon having first and second regions of opposite conductivity type therein with a p-n junction therebetween;

a region about the p-n junction containing lattice defects and hydrogen which region emits light at a wavelength of about 1.25 micrometers; and

electrical contacts on the regions of opposite conductivity type at opposite sides of said p-n junction whereby a current can be passed across said junction for achieving electroluminescence at said p-n junction.

4,684,965

MONOLITHIC PROGRAMMABLE ATTENUATOR

Yusuke Tajima, Acton, Mass., and Toshikazu Tsukii, Santa Barbara, Calif., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 492,857, May 9, 1983. This application Dec. 20, 1985, Ser. No. 810,900

Int. Cl.⁴ H01L *29/50, 29/52*

U.S. Cl. 357—22 **5 Claims**

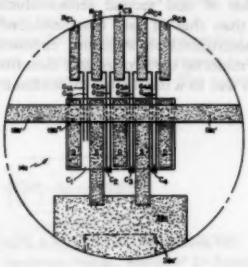
1. A field effect transistor comprising:

a drain electrode and a source electrode;

a region disposed between said drain and source electrodes; and

a gate electrode having a selected gate width to provide said gate electrode disposed over a first portion of said region with a remaining second portion of said region being isolated from the gate electrode, and with the conductivity between drain and source electrodes through said first portion of said region being controlled between a conductive state and a nonconductive state by a signal having a

pair of voltage level states applied to the gate electrode and with the second portion of the region remaining con-



ductive between source and drain electrodes independent of the state of the signal applied to the gate electrode.

4,684,966

STATIC INDUCTION TRANSISTOR PHOTODETECTOR HAVING A DEEP SHIELDING GATE REGION

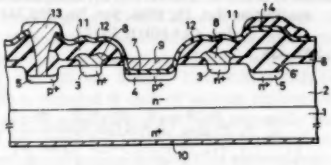
Junichi Nishizawa, No. 6-16, Komegafukuro 1-chome, Sendai-shi; Sobei Suzuki, and Takashige Tamamushi, all of Miyagi, Japan, assignors to Junichi Nishizawa, Sendai, Japan

Division of Ser. No. 561,103, Dec. 13, 1983, Pat. No. 4,536,946. This application Jul. 16, 1985, Ser. No. 745,972

Claims priority, application Japan, Dec. 13, 1982, 57-218591

Int. Cl.[4] H01L *29/80, 27/14*

U.S. Cl. 357—22 **11 Claims**



1. A photodetector comprising a vertical static induction transistor comprising:

a control gate region formed on a first principal surface of a silicon wafer;

a shielding gate region formed on said first principal surface surrounding said control gate region; at least one first principal electrode region formed on said first principal surface in an area between said control gate region and said shielding gate region, said shielding gate region being formed in said silicon wafer, a top boundary and a bottom boundary of said shielding gate region being deeper than a respective top boundary and a bottom boundary of said first principal electrode region; and

a second principal electrode region formed on a second principal surface of said silicon wafer on the side opposite said first principal electrode region.

4,684,967

LOW CAPACITANCE TRANSISTOR CELL ELEMENT AND TRANSISTOR ARRAY

David L. Taylor, Sr., Monument, and Hugh N. Chapman, Colorado Springs, both of Colo., assignors to Integrated Logic Systems, Inc., Colorado Springs, Colo.

Filed May 4, 1984, Ser. No. 607,282

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.11 **5 Claims**

1. A transistor cell element adapted for use in large scale integrated circuits, comprising:

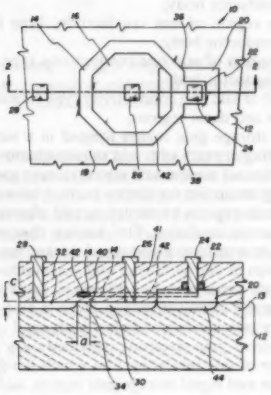
a substrate material;

an isolation region formed in a selected geometrical shape on said substrate material and having a surrounding perimeter;

an inner carrier region formed in said substrate material adjacent said isolation region and having a relatively high density of first charge carriers;

a channel region formed in said substrate and extending away from said isolation region at a first location along its perimeter, around said inner carrier region and back to said isolation region at a second location along its perimeter in a generally closed loop so that the isolation region and said channel region cooperate to enclose said inner carrier region, said channel region having a relatively low density of second charge carriers;

an outer carrier region having a relatively high density of first charge carriers and positioned around said channel region whereby said inner and outer carrier regions face one another across said channel region;



said isolation region extending completely across said closed loop and laterally into said outer carrier region to separate said inner carrier region into first and second inner carrier regions, said channel into first and second channel segments and said outer carrier region into first and second outer carrier regions, said first inner and outer carrier regions facing one another across said first channel segment and having a relatively high density of first charge carriers, said inner and outer carrier regions facing one another across said second channel segment and having a relatively high density of second charge carriers, said first channel segment having a relatively low density of second charge carriers and said second channel segment having a relatively low density of first charge carriers; and

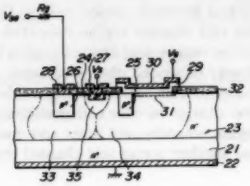
a gate structure formed over said channel region and including a band of conductive material configured to match the path of said channel region and separated therefrom by a layer of insulating material, said band having a contact portion extending over said isolation region.

4,684,968

JFET IMAGER HAVING LIGHT SENSING INVERSION LAYER INDUCED BY INSULATOR CHARGE

Yoshinori Ohta, Kamiina, and Jun-ichi Nishizawa, No. 6-16, 1-Chome, Komegafukuro, Sendai City, Miyagi Pref., both of Japan, assignors to Olympus Optical Co., Ltd. and Jun-ichi Nishizawa, both of, Japan

Filed Dec. 2, 1983, Ser. No. 557,236
Claims priority, application Japan, Dec. 14, 1982, 57-217756
Int. Cl.[4] H01L *31/10, 27/14*
U.S. Cl. 357—30 4 Claims



1. A solid-state imaging element having a static induction transistor comprising:

a semiconductor body;

a source region of one conductivity type formed in said semiconductor body;

a drain region of said one conductivity type formed in said semiconductor body;

a channel of said one conductivity type formed between said source and drain regions;

a signal storage gate region formed in a surface of and in rectifying contact with said semiconductor body adjacent said channel region, said signal storage gate region comprising means for regulating current between said source and drain regions by depleting said channel region;

a transparent insulating film having charges therein provided on a surface of said signal storage gate region and on a portion of said surface of said semiconductor body adjacent said signal storage gate region, said charges resulting in a steady stream inversion layer in said portion of said surface of said semiconductor body; and

a transparent gate electrode provided on a portion of said surface of said insulating film which is substantially situated on said signal storage gate region, said gate electrode being isolated from said gate region by said insulating film;

wherein at the time of storing carriers generated by an incident light said inversion layer is modified whereby the carriers generated in a depletion layer portion under said inversion layer are stored in said inversion layer, so that the depleting of said channel region is modified by said carriers.

4,684,969

HETEROJUNCTION AVALANCHE PHOTODIODE

Kenko Taguchi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 9, 1984, Ser. No. 629,292
Claims priority, application Japan, Jul. 8, 1983, 58-124478
Int. Cl.[4] H01L *27/14, 31/00*
U.S. Cl. 357—30 4 Claims

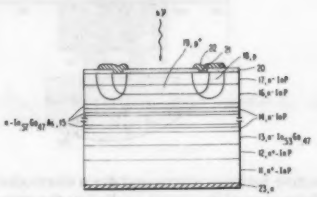
1. An avalanche photodiode comprising:

a substrate of a first conductivity type;

a first semiconductor layer of a first conductivity type having a greater ionization rate for minority carriers than for majority carriers, said first semiconductor layer being formed over said substrate;

a second semiconductor layer of said first conductivity type, having a smaller bandgap than said first layer to provide an absorption region;

a multi-heterojunction structure positioned between said first and second semiconductor layers and comprising, alternately laid one over the other, semiconductor layers of said first conductivity type and having a bandgap not smaller than that of said first semiconductor layer, and fourth semiconductor layers having a bandgap not smaller than that of said second semiconductor layer but not larger than that of said first semiconductor layer, said multi-heterojunction structure enhancing an ionization rate of minority carriers greater than that of said majority carriers due to a band edge discontinuity;



a semiconductor region of a second conductivity type formed within said first semiconductor layer to provide a PN junction separated from the multi-heterojunction structure; and

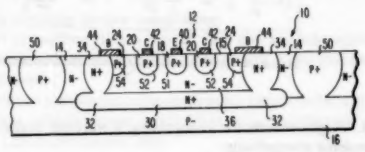
a pair of electrodes disposed over said substrate and said semiconductor layer of the second conductivity type, for biasing said PN junction.

4,684,970

HIGH CURRENT LATERAL TRANSISTOR STRUCTURE

Maurice W. Sloane, Clinton, N.J., and Thomas V. Sikina, Doylestown, Pa., assignors to RCA Corporation, Princeton, N.J.

Continuation of Ser. No. 759,831, Jul. 29, 1985, abandoned. This application Jul. 21, 1986, Ser. No. 885,744
Int. Cl.[4] H01L *29/72*
U.S. Cl. 357—35 8 Claims



1. A high current lateral bipolar transistor for use in an integrated circuit comprising:

(a) a substrate of a first conductivity type semiconducting material;

(b) a first layer of a second conductivity type semiconducting material disposed on said substrate having a surface and a thickness extending from said surface to said substrate;

(c) a first region, being an emitter of said transistor, of highly doped first conductivity type disposed within and in PN junction forming relation with said first layer and extending downwardly from said surface for a distance equal to a portion of said thickness;

(d) a second region, being a collector of said transistor, of highly doped first conductivity type disposed within and in PN junction forming relation with said first layer spaced from and surrounding said first region and extending downwardly from said surface for a distance equal to said portion of said thickness;

(e) a third region of highly doped first conductivity type disposed within and in PN junction forming relation with said first layer spaced from and surrounding said second region and extending downwardly from said surface;

(f) a second layer of highly doped second conductivity type semiconducting material intermediate a portion of said

substrate and said first layer and being spaced from and opposed to said first, second, and third regions;

(g) a fourth region of highly doped second conductivity type disposed within said first layer extending downwardly from said surface; and

(h) conductor means for electrically connecting said third and four regions, wherein said third region is adapted to conduct excess current between said first region and said fourth region.

4,684,971

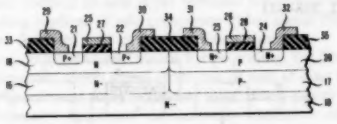
ION IMPLANTED CMOS DEVICES

Richard S. Payne, Andover, Mass., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 13, 1981, Ser. No. 243,621

Int. Cl.[4] H01L *29/78, 27/02*

U.S. Cl. 357—42 **4 Claims**



1. A CMOS device comprising a substrate (**10**) of a first conductivity type having a major surface, a first tub region (**17**) of opposite conductivity type formed at said surface wherein source and drain regions (**23** and **24**) are formed, a second tub region (**15**) of the same conductivity type but higher impurity concentration than said substrate wherein source and drain regions (**21** and **22**) are formed, CHARACTERIZED IN THAT there is included in each of said tub regions a surface region (**20** and **18** respectively) covering essentially the same area as said tub region and having the same conductivity type but a greater impurity concentration than said tub region, and extending to a depth at least as great as that of said source and drain regions such that the impurities of the tub regions overlap but are compensated for by the impurities of the surface region of opposite conductivity type in the area of overlap.

4,684,972

NON-VOLATILE AMORPHOUS SEMICONDUCTOR MEMORY DEVICE UTILIZING A FORMING VOLTAGE

Alan E. Owen, Edinburgh, Scotland; Gerard Sarrabayrouse, Tolouse, France; Peter G. LeComber, and Walter E. Spear, both of Dundee, Scotland, assignors to The British Petroleum Company, P.L.C., London, England

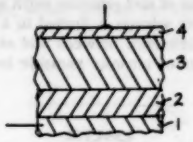
Continuation of Ser. No. 405,395, Aug. 5, 1982, abandoned. This application Jun. 24, 1985, Ser. No. 748,125

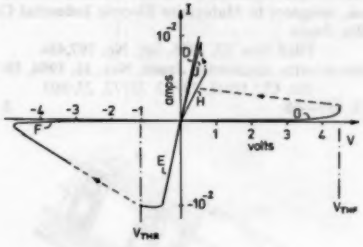
Claims priority, application United Kingdom, Aug. 7, 1981, 8124248

Int. Cl.[4] H01L *45/00*

U.S. Cl. 357—59 **29 Claims**

1. A nonvolatile semiconductor memory device comprising a substrate, at least superimposed layers of p- and n-doped amorphous semiconductor material supported by the substrate, and electrical contact means for applying an electrical potential across the layers, said device being electrically formed to have a property of exhibiting at least two distinct conductance states of high and low conductance, respectively, at a predetermined range of applied voltages extending through zero volts and being repeatably switchable between said states by positive





and negative switching voltages respectively of magnitude at least as great as given positive and negative threshold voltages.

4,684,973

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING GROUND CONNECTIONS ARRANGED TO ELIMINATE MUTUAL INTERFERENCE BETWEEN ISLAND-DISPOSED ELECTRONIC CIRCUITS

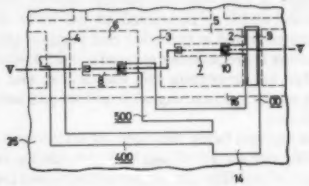
Hajime Takano, and Hiromitsu Yamashita, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 474,941, Mar. 14, 1983, abandoned. This application Dec. 13, 1985, Ser. No. 808,240

Claims priority, application Japan, Mar. 15, 1982, 57-43531

Int. Cl.[4] H01L *23/52, 23/48*

U.S. Cl. 357—68 **7 Claims**



1. A semiconductor integrated circuit device, comprising; at least two electronic circuit portions formed in a common semiconductor substrate, at least two island regions wherein said electronic circuit portions are respectively formed, a plurality of separation regions respectively formed between adjacent island regions and being electrically contiguous with said substrate, earth electrodes for said substrate being disposed on ones of said separation regions, substrate earth wirings having first and second ends and being connected at first ends to said earth electrodes, a plurality of circuit earth wirings having first and second ends and being connected at first ends to said electronic circuit portions, and a common earth electrode formed on said semiconductor integrated circuit device and directly connected to the second ends of said substrate earth wirings and to a substantial majority of the second ends

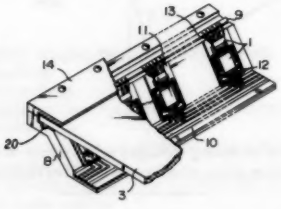
of said circuit earth wirings, a substantial minority of said second ends of said circuit earth wirings being electrically connected to adjacent ones of said substrate earth wirings, wherein the number of said substrate earth wirings connected to said circuit earth wirings is limited in a manner so as to reduce mutual interference between said circuit portions by reducing the effect of intrinsic parasitic impedances of the circuit device.

4,684,974

ELECTRODE CONNECTION STRUCTURE OF FLAT DEVICE

Koji Matsunaga, Hirakata, and Kenzo Hatada, Katano, both of Japan, assignors to Matsushita Electric Industrial Co. Ltd., Osaka, Japan

Filed Nov. 13, 1985, Ser. No. 797,484
Claims priority, application Japan, Nov. 16, 1984, 59-242886
Int. Cl.[4] H01L *23/32, 23/12, 21/603*
U.S. Cl. 357—68 **3 Claims**



1. An electrode connection arrangement comprising:
- a flat device having a first surface on which a plurality of electrodes are provided at the periphery thereof and a second surface opposite to said first surface;
- a plurality of film carriers each having at least one semiconductor device carried thereon and having leads at least provided at two end portions thereof; the leads at at least one of said end portions being in contact with respective ones of said plurality of electrodes of said flat device;
- a connecting frame member having a cushion material which is provided at a position where the electrodes of said flat device contact with the leads of said film carriers provided at said one end portion theroef, and a circuit substrate which is connected to the leads of said film carriers provided at the other end portions thereof;
- a supporting frame member secured to said connected frame member for supporting said flat device, said supporting frame member contacting with said second surface of said flat device;
- said film carriers being provided on said connecting frame member, one surface of said leads provided at said one end portion of said film carriers being positioned on said cushion material and an opposite surface of said leads being in contact with the respective electrodes of said flat device.

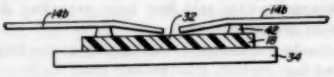
4,684,975

MOLDED SEMICONDUCTOR PACKAGE HAVING IMPROVED HEAT DISSIPATION

Hem P. Takiar, San Jose, and Kamal N. Mehta, Sunnyvale, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Dec. 16, 1985, Ser. No. 809,442
Int. Cl.[4] H01L *23/36*
U.S. Cl. 357—70 **8 Claims**

1. A semiconductor package having enhanced heat dissipation, said package comprising an encapsulated semiconductor device having a plurality of bonding pads arranged around its periphery and metal tape leads bonded to said bonding pads, wherein said metal tape leads extend inward from the bonding pads and over central active regions on the semiconductor



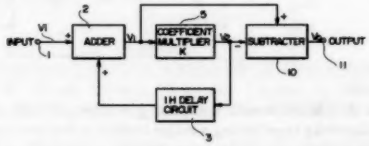
device, whereby said leads are able to conduct heat outward from the central regions.

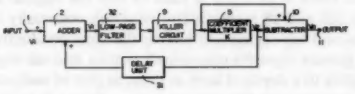
4,684,976

FEEDBACK COMB-TYPE FILTER

Shoichi Sugihara, and Sumio Katoh, both of Nagaokakyo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 15, 1986, Ser. No. 852,207
Claims priority, application Japan, Apr. 18, 1985, 60-83513; Aug. 8, 1985, 60-174485; Aug. 30, 1985, 60-192513
Int. Cl.[4] H04N *9/78, 5/213*
U.S. Cl. 358—31 **17 Claims**



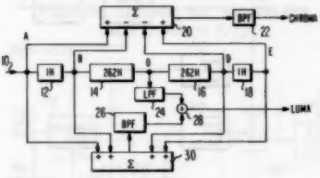


1. A feedback comb-type filter for forming a sequence of narrow pass bands or narrow stop bands centered at multiples of some specified frequency by insertion loss thereof, comprising:
- an operation means which has a first input terminal being input the video signals and a second input terminal;
- a coefficient multiplier for multiplying the output of said operation means by a coefficient K;
- a subtracter whose subtracting input terminal is given the output of said coefficient multiplier and whose subtracted input terminal is given the output of said operation means; and
- a delay circuit for delaying the output of said coefficient multiplier by the duration corresponding to one horizontal scanning period of the video signal;
- whereby said operation means operates the video signals being input from said first input terminal and delayed output of said delay circuit delayed by the duration corresponding to one horizontal scanning period of the video signal, and
- said subtracter subtracts the signal which is the operation result of said operation means being multiplied by the coefficient K by said coefficient multiplier from the operation result of said operation means,
- so that the subtraction result of said subtracter is output as the filter output.

4,684,977
LUMINANCE/CHROMINANCE SEPARATION CIRCUITRY

Robert A. Dischert, Burlington, N.J.; Joseph R. Ader, Yardley, and Robert J. Topper, Philadelphia, both of Pa., assignors to RCA Corporation, Princeton, N.J.

Filed Jul. 29, 1985, Ser. No. 759,832
Int. Cl.[4] H04N 9/78
U.S. Cl. 358—31 8 Claims



1. Apparatus for separating a luminance component from composite video signal, comprising:

an input terminal for applying said composite video signal;

means coupled to said input terminal for concurrently providing replicas of said composite video signal from at least two fields of said composite video signal;

means, coupled to said means for providing, for filtering said composite video signal from one of said at least two fields to produce a low frequency luminance signal having a frequency spectrum substantially exclusive of the frequency spectrum occupied by chrominance components of said composite video signal;

means, coupled to said means for providing, for combining composite video signals from the other of said at least two fields to the exclusion of said one field to produce a high frequency luminance signal having a frequency spectrum substantially exclusive of the frequency spectrum of said low frequency luminance signal; and

means for combining said low and said high frequency luminance signals to produce a wideband luminance signal.

4,684,978
CORRECTION METHOD OF COLOR-SEPARATED SIGNALS

Mitsuhiko Yamada, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co. Ltd., Kyoto, Japan

Filed Jun. 25, 1985, Ser. No. 748,750
Claims priority, application Japan, Sep. 18, 1984, 59-193972
Int. Cl.[4] H04N 1/46
U.S. Cl. 358—75 11 Claims

1. A method for correcting original color-separated signals in advance of preparation of printing plates in order to improve the color tone of printing results, comprising the steps:

storing in a first memory device the original color-separated signals corresponding to amounts of respective inks;

displaying the contents of the first memory device on a color monitor which is adapted to simulate the printing results;

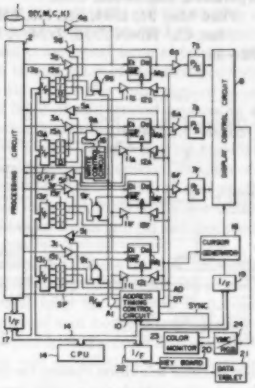
designating the address of desired picture elements in the first memory device while making use of said picture displayed on the color monitor, and reading out the original color-separated signals of the desired picture elements from the designated addresses;

making changes to the black ink component of the read-out color-separated signals and adjusting the amou t of the rest of the inks so as to obtain a color tone equivalent to the original color-separated signals of each desired picture element, said changes and adjustments reducing the amount of the rest of the inks needed in printing with said equivalent color tone;

storing the adjusted color-separated signals in a second memory device at addresses corresponding to the desired picture elements of the original color-separated signal;

applying flags to desired picture elements in which the amounts of the respective inks have been adjusted and storing the flags in a third memory device at addresses corresponding to their original picture elements; and

storing values, which indicate the amount of change of the

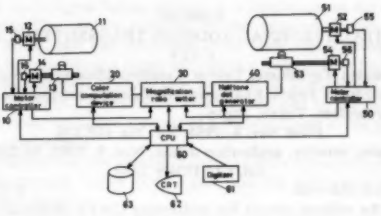


new black ink components of each desired picture element relative to the corresponding original black ink components, in a fourth memory device at addresses corresponding to the original picture elements upon adjusting the amounts of the respective color inks.

4,684,979
SYSTEM FOR ALLOCATING IMAGES ONTO PHOTOSENSITIVE MATERIALS UTILIZING FLAGS

Makoto Hirosawa, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Jun. 26, 1984, Ser. No. 625,782
Claims priority, application Japan, Sep. 13, 1983, 58-168862
Int. Cl.[4] H04N 1/46, 1/343
U.S. Cl. 358—75 5 Claims



1. In a method for reproducing an original image using a color separation technique including reproduction of a plurality of recorded images corresponding to the original image, the improvement comprising the steps of:

creating a data base file including a plurality of records respectively identifying and corresponding to various images to be recorded, and

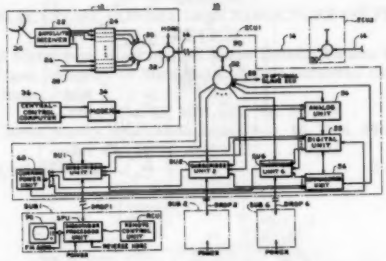
including a flag in each record to indicate whether or not the image corresponding to the record has been recorded.

4,684,980

SYSTEM FOR CONTROLLING COMMUNICATIONS ON A CABLE TELEVISION NETWORK

Robert M. Rast, and David Wreford-Howard, both of Englewood, Colo., assignors to American Television & Communications Corporation, Englewood, Colo.

Filed May 31, 1984, Ser. No. 615,957
Int. Cl.[4] H04N *7/10, 7/14, 7/173*
U.S. Cl. 358—86 **5 Claims**



4. A two-way cable television system for transmitting television signals and other signals via a cable network from a head end to addressable devices at a plurality of remote locations, comprising:

means associated with the head end for transmitting polling signals to the devices;

means associated with each device for storing information and for assigning a level of importance to the stored information;

means associated with the head end for transmitting to the devices priority information control signals including data indicative of a priority threshold level of importance at which the devices should transmit information to the head end;

means associated with each device for receiving the priority information control signals and for comparing the level of importance of the information stored in the associated device with the priority threshold level of importance indicated by the priority information control signals; and

means associated with each device responsive to said receiving and comparing means and to any received polling signal for transmitting to the head end a response signal if the level of importance of the stored information bears a predetermined relationship to the priority threshold level of importance indicated by the priority information control signals.

4,684,981

DIGITAL TERMINAL ADDRESS TRANSMITTING FOR CATV

Masakatsu Toyoshima, Tokyo; Yasuhiro Hideshima, Saitama, and Etsumi Fujita, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 8, 1984, Ser. No. 669,376
Claims priority, application Japan, Nov. 9, 1983, 58-210353
Int. Cl.[4] H04N *7/10*
U.S. Cl. 358—86 **4 Claims**

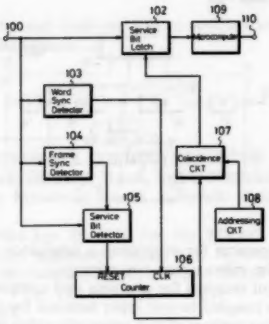
1. An address circuit for addressing CATV terminals; said circuit comprising:

a signal input terminal connected to a CATV transmision line for receiving digital signals that are transmitted through said transmission line and include frame synchronizing signals, word synchronizing signals, service bit signals, and data signals, each of said service bit signals including a plurality of bits forming one of a plurality of possible patterns, said patterns respectively representing at least the start, continuation and end of a counting function;

a frame synchronization detector connected to said signal input terminal for detecting said frame synchronizing signals;

a word synchronization detector connected to said signal input terminal for detecting said word synchronizing signals;

a service bit detector connected to said signal input terminal and said frame synchronization detector for detecting a



predetermined service bit signal after each of said frame synchronizing signals has been detected and for identifying said one of said patterns; and

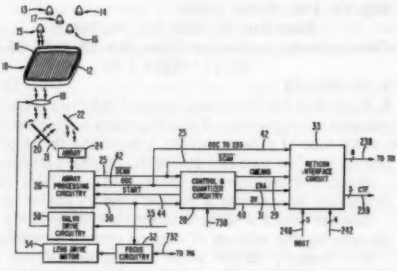
counter means connected to said service bit detector and said word synchronization detector for counting said word synchronizing signals under the control of said service bit detector and for producing an address control signal for selectively addressing said CATV terminals.

4,684,982

MULTIPLE ARRAY PANEL MATRIX MEASUREMENT SYSTEM

Frank S. Krufka, Mount Joy, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Feb. 28, 1986, Ser. No. 834,388
Int. Cl.[4] H04N *7/18, 17/00*
U.S. Cl. 358—107 **6 Claims**



1. A system for measuring spaces in a periodic matrix comprising:

means for simultaneously irradiating said matrix with energy at a plurality of discrete locations;

means for simultaneously receiving the energy from said matrix at said locations and producing signals representative of said spaces and areas therebetween;

means coupled to said producing means for simultaneously converting said signals for each location into data values and transmitting said data values in parallel to respective means for storing said data values; and

means coupled to said storing means for sequentially ad-

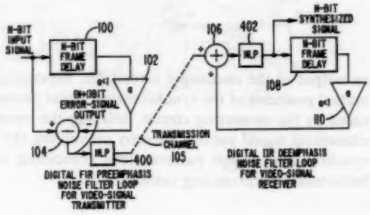
dressing said respective storing means for seriatim transfer of said data values to a computer.

4,684,983

NON-LINEAR PROCESSOR FOR REDUCING THE DYNAMIC RANGE OF A DIGITIZED ERROR SIGNAL

Alfonse Acampora, Staten Island, N.Y., and Chung H. Lu, Plainsboro, N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Jul. 31, 1986, Ser. No. 890,958
Int. Cl.[4] H04N 7/12
U.S. Cl. 358—135 **20 Claims**



1. In a digital processing system for use in processing an input signal comprised of a temporal stream of successive digitized input samples occurring as a given sample frequency, the level value defined by each of said input samples being represented by a multibit code comprised of N bits, where N is a given plural number capable of defining a maximum numerical value M, and wherein at least a predetermined subset of said input samples defines successive level values of a specified parameter that recurs at each of successive time intervals equal to a first interval number of periods of said given sample frequency; said system being comprised of first and second loops eaoh of which includes delay means for delaying samples that are applied to said delay means by a second integral number of said time intervals, said first loop further including first processing means coupled to said delay means thereof and including subtraction means for deriving from said input signal an output signal comprised of samples each of which defines a level value that corresponds to the difference between the respective level values of the current sample of said specified parameter and a first given function of at least one previous sample of said specified parameter, and said second loop further including second processing means coupled to said delay means thereof and to said first loop and including summation means for deriving from said output signal of said first loop a synthesized signal comprised of samples each of which defines a level value that corresponds to the sum of the respective level values of the current sample of said first-loop output signal and a second given function of at least one previous sample of said first-loop output signal, said second given function being substantially the inverse function of said first given function; and wherein said subtraction means derives an error signal comprised of samples each of which defines a level value equal to the difference between the N-bit level values of said N-bit current sample of said specified parameter and the corresponding N-bit delayed sample of said specified parameter whereby a multibit oode of (N+1)-bits one bit of which represents polarity and N bits of which represent absolute value, is required to represent the algebraic level value of each of said error-signal samples, and said summation means derives a sum signal comprised of samples each of which defines a level value equal to the sum of the level value of the current sample of the output signal of said first loop and the corresponding delayed sample of the output signal of said first loop; the improvement wherein:

each of said first and second processing means of said respective first and second loops further comprises non-linear processor (NLP) means exhibiting a given non-linear characteristic for modifying the level value X of sample-inputs thereto, said given non-linear characteristic being such that for sample-inputs thereto having (1) negative values of X that are more negative than minus M/2, the output is equal to (M+X), (2) negative values of X that are less negative than minus M/2, the output is equal to X, (3) positive values of X that are less positive than plus M/2, the output is equal to X, and (4) positive values of X that are more positive than plus M/2, the output is equal to (−M+X), said error-signal samples being applied as said sample-inputs to said NLP of said first processing means, and said sum-signal samples being applied as said sample-inputs to said NLP of said second processing means;

said first processing means further comprises first derivation means coupled to said delay means of said first loop for deriving said corresponding delayed samples of said specified parameter, after a delay equal to said second interval number of time intervals, from solely one of (a) said input samples of said input signal and (b) said modified error-signal samples; and

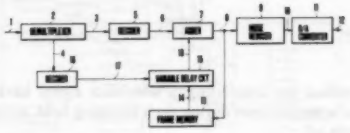
said second processing means further comprises second derivation means coupled to said delay means of said second feedback loop for deriving said corresponding delayed samples of said output signal of said first loop, after a delay equal to said second interval number of time intervals, from said modified sum-signal samples.

4,684,984

MOTION COMPENSATED INTERFRAME DECODING APPARATUS

Akira Hirano, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 494,110, May 12, 1983, abandoned.
This application Sep. 2, 1986, Ser. No. 903,881
Claims priority, application Japan, May 14, 1982, 57-80922
Int. Cl.[4] H04N 7/12
U.S. Cl. 358—136 **6 Claims**



1. A motion-compensated interframe decoding apparatus for decoding a coded television signal and reducing mosaic noise which includes a motion vector code signal and a prediction error code signal on the basis of a plurality of blocks obtained by dividing up one frame of a television picture, the motion vector code signal being defined as a displacement between corresponding picture elements of two adjacent frames in a given block, and the prediction error code signal being obtained by quantizing a signal indicating a difference between a motion-compensated prediction signal of an immediately preceding frame in a given block which is obtained by the motion vector code signal and a signal of a present frame in the given block, comprising:

a demultiplexer for receiving the television signal which has the motion vector code signal and the prediction error code signal;

a first decoder connected to said demultiplexer so as to receive the prediction error code signal;

a second decoder connected to said demultiplexer so as to receive the motion vector code signal;

a variable delay circuit means connected to said second decoder so as to receive a decoded motion vector signal and to produce a prediction signal in response to the decoded motion vector signal;

adder means connected to said first decoder and said variable delay circuit so as to produce a television signal corresponding to the received decoded prediction error signal, and prediction signal;

frame memory means connected to receive the television signal from said adding means, and connected to supply the television signal, delayed by about one frame to said variable delay circuit, to facilitate the variable delay circuit in producing the prediction signal in response to the decoded motion vector signal;

noise reducing means for reducing at least a small interframe variation component of the television signal from said adding means thereby reducing mosaic noise; and

a digital-to-analog converter, connected to said noise reducing means, for converting a digital signal from said noise reducing means to an analog signal wherein said analog signal is substantially free from mosaic noise.

4,684,985

SIGNAL CONVERTING METHOD AND CIRCUIT FOR TELEVISION RECEIVER

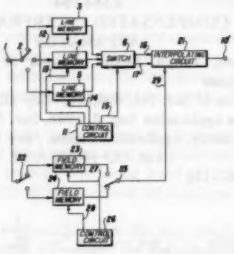
Nobuhumi Nakagaki; Toshinori Murata, and Toshiyuki Kurita, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 2, 1985, Ser. No. 751,267

Claims priority, application Japan, Jul. 23, 1984, 59-151220

Int. Cl.[4] H04N *7/01*

U.S. Cl. 358—140 **21 Claims**



1. A method for converting a television signal having a plurality of scanning lines during each scanning field, comprising the steps of:

storing the television signal corresponding to at least two adjacent scanning lines of a present field,

storing the television signal corresponding to at last occurring field,

producing a line interpolation signal in the present field corresponding to a scanning line between said two adjacent scanning lines, in dependence upon the television signal corresponding to said two adjacent scanning lines of the presnt field and a television signal in said last occurring field corresponding to said scanning line between said two adjacent scanning lines of the present field.

4,684,986

TELEVISION SIGNAL MEMORY-WRITE CIRCUIT

Frits A. Steenhof; Petrus W. G. Welles, both of Eindhoven; Petrus A. C. M. Nuijten, Bergen op Zoom, and Jan van der Meer, Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 3, 1985, Ser. No. 730,392

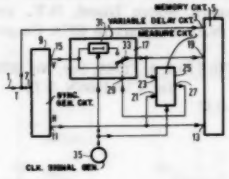
Claims priority, application Netherlands, May 3, 1984, 8401404

Int. Cl.[4] H04N *5/04, 5/14*

U.S. Cl. 358—148 **6 Claims**

1. In a television signal memory-write circuit for writing a television signal coupled to respective horizontal and vertical synchronizing signal patterns during respective horizontal and vertical write periods, the patterns being derived from a television signal to be entered into a television signal memory circuit having a measuring circuit for measuring in each field mutual positions of the synchronizing signal patterns, the memory-write circuit comprising:

a variable delay circuit located within a vertical synchronizing signal path, the path determining the vertical write periods, a signal input of the delay circuit being coupled to



an output of the measuring circuit for, depending on the mutual positions of the synchronizing signal patterns measured by the measuring circuit, delaying the vertical synchronizing signal pattern, thereby preventing the vertical synchronizing signal pattern from coinciding with the horizontal synchronizing pattern.

4,684,987

CRT DISPLAY UNIT

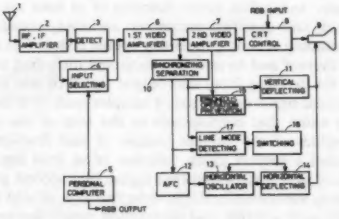
Akio Tsutsui, Imaichi, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 16, 1985, Ser. No. 766,334

Claims priority, application Japan, Aug. 31, 1984, 59-133023[U]; Oct. 23, 1984, 59-223477; Oct. 24, 1984, 59-224853; Dec. 25, 1984, 59-200021

Int. Cl.[4] H04N *5/04*

U.S. Cl. 358—148 **9 Claims**



1. A CRT display unit capable of selecting a standard mode and a high-resolution mode, comprising:

synchronizing signal separating means for separating a horizontal synchronizing signal and a vertical synchronizing signal from a composite video signal,

counting means for counting said horizontal synchronizing signal, said counting means being reset by said vertical synchronizing signal,

determining means for determining said standard mode or said high-resolution mode upon receipt of the count output of said counting means, and

horizontal output means for selecting and providing, a horizontal oscillating frequency, a horizontal amplitude and a horizontal flyback period according to the respective modes based on the determination output of said determining means.

4,684,988

CIRCUIT ARRANGEMENT FOR DETECTING THE VERTICAL BLANKING PERIODS IN A PICTURE SIGNAL

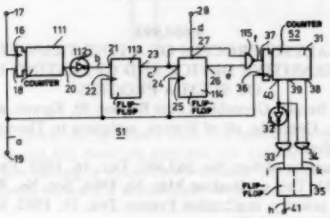
Kurt J. Johannes, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 27, 1984, Ser. No. 675,153

Claims priority, application Fed. Rep. of Germany, Dec. 1, 1983, 3343455

Int. Cl.[4] H04N 5/08

U.S. Cl. 358—154 **13 Claims**



1. A circuit for detecting vertical blanking in a picture signal, comprising a pulse interval detector for receiving a composite synchronizing signal in said picture signal containing a plurality of consecutive pulses in a predetermined sequence during a vertical interval of said picture signal, means for measuring time intervals between said consecutive pulses, said means for measuring forming an output signal during time intervals between said consecutive pulses which fall short of a predetermined time threshold, said time threshold equals to a predetermined number of periods of a periodic clock signal, and a pulse shaping means for receiving said output signal from said pulse interval detector, said pulse shaping means comprising means for detecting said sequence of pulses of said composite synchronizing signal, said means for detecting being enabled by said output signal of said pulse interval detector, and means responsive to said detecting means for producing a vertical synchronizing signal.

4,684,989

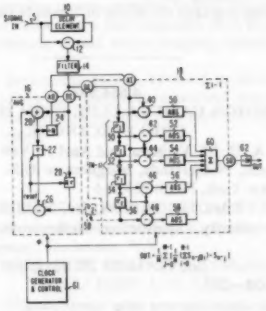
SIGNAL BACKGROUND NOISE DETECTOR

Barbara J. Roeder, Pt. Pleasant, Pa.; Leopold A. Harwood, Bridgewater, and Hermann J. Weckenbrock, Bordentown Township, Burlington County, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Feb. 7, 1986, Ser. No. 826,998

Int. Cl.[4] H04N 5/217, 5/21; G06G 7/12

U.S. Cl. 358—167 **9 Claims**



1. A noise estimating circuit comprising:

an input terminal for applying an input signal;

means, coupled to said input terminal, for producing difference samples corresponding to differences between substantially redundant intervals of said input signal;

averaging means, coupled to said means for producing difference samples, for generating an average of a predetermined number of said difference samples;

means, coupled to said means for producing difference samples and to said averaging means, for generating magnitude values of differences between said average and ones of said difference samples contributing to said average; and

means, coupled to said means for generating magnitude values, for producing a noise estimate signal corresponding to an average of a predetermined number of said magnitude values.

4,684,990

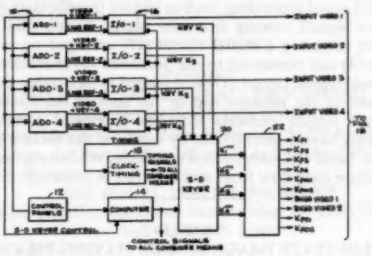
METHOD AND APPARATUS FOR COMBINING MULTIPLE VIDEO IMAGES IN THREE DIMENSIONS

Leslie J. Oxley, Redwood City, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Apr. 12, 1985, Ser. No. 722,893

Int. Cl.[4] H04N 5/262, 13/00, 13/02

U.S. Cl. 358—183 **26 Claims**



1. A system for combining a plurality of respective input video signals, each video signal comprising data samples corresponding to respective discrete loctions on a viewing plane and having associated therewith input key signals corresponding to respective said locations, said system comprising

means in respect to each of said input video signals for producing a respective sequence of priority signals corresponding to a respective sequence of said discrete locations,

means responsive to said priority signals and respective said input key signals for producing in respect to each input video signal a set of processed key signals corresponding to respective coordinate locations on said viewing plane in said respective sequence, each said set of processed key signals indicating the weighted portion of the respective data samples to be included in a combined video signal at each respective coordinate location,

cutter means responsive to said sets of processed key signals for cutting corresponding said data samples to produce corresponding weighted data samples in respect to each input video signal in said respective sequence, and

combining means for combining said weighted data samples of said plurality of input video signals for each respective coordinate location on said viewing plane in said respective sequence to produce a combined output video signal.

4,684,991
DEVICE FOR AN ARRAY OF PHOTO DIODES ARRANGED IN A MATRIX

Robert Forchheimer, Tingsvägen 24A, 582 49 Linköping, and Anders Ödmark, Minsjö Säteri, 605 90 Norrköping, both of Sweden

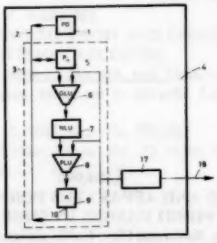
PCT No. PCT/SE84/00083, § 371 Date Oct. 22, 1984, § 102(e) Date Oct. 22, 1984, PCT Pub. No. WO84/03810, PCT Pub. Date Sep. 27, 1984

PCT Filed Mar. 7, 1984, Ser. No. 676,196

Claims priority, application Sweden, Mar. 15, 1983, 8301398

Int. Cl.[4] H04N *3/12*

U.S. Cl. 358—213.11 **3 Claims**



1. Device for an array (1) of photo diodes, arranged in a matrix, which are integrated onto the same semi-conductor substrate (4) as a picture processor (3) connected to the photo diodes, where the picture processor (3) is of a type allowing parallel signal processing, such as picture transformation of the picture signals coming from the photo diodes, said device further including a digital circuit (17) arranged on said substrate (4) and connected to the processor (3) characterized in that said digital circuit (17) is arranged to determine the number and/or the position and/or the sum of the positions of selected picture elements from the processed picture, said elements having been found, by means of the picture processor, to fulfill a predetermined condition, whereby a reduction of picture data flow from said substrate is achieved.

4,684,992
SOLID STATE IMAGE SENSOR HAVING MEANS TO RESET AND CLEAR STATIC INDUCTION TRANSISTOR PHOTOELEMENTS

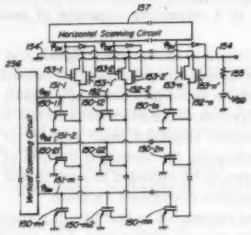
Tsutomu Nakamura, and Kazuya Matsumoto, both of Ina, Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Nov. 18, 1985, Ser. No. 799,136

Claims priority, application Japan, Nov. 21, 1984, 59-244637

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.12 **5 Claims**



1. A solid state image sensor comprising a number of pixels arranged in a matrix, each pixel being formed by a lateral type static induction transistor which includes source and drain regions formed in a surface of a semiconductor layer formed on an insulating or high resistance semiconductor substrate, and a gate region formed between the source and drain regions for controlling a source-drain current flowing in parallel with the surface of the semiconductor layer; and

driving means for selectively supplying to said gate region a read out signal for reading an image signal in accordance with photocarriers stored in each pixel, a reset signal for discharging all the stored photocarriers, and a clear signal for discharging a part of the stored photocarriers after a reset operation, and prior to a next read out operation, said clear signal being set to such a value that the gate region is reverse biased to a lesser extent than by the reset signal.

4,684,993
ANALYSIS PROCESS OF A LINE TRANSFER PHOTOSENSITIVE DEVICE AND OPERATING DEVICE OF SUCH A PROCESS

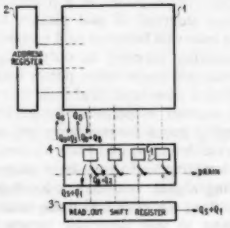
Jean-Luc Berger, Grenoble; Louis Brissot, St. Egreve, and Yvon Cazaux, Grenoble, all of France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 562,462, Dec. 16, 1983, Pat. No. 4,611,234. This application May 30, 1986, Ser. No. 869,133

Claims priority, application France, Dec. 21, 1982, 82 21396; Sep. 9, 1983, 83 14403

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.31 **2 Claims**



1. A line transfer photosensitive device comprising a photosensitive zone of M lines of N photosensitive points, the photosensitive points of the different lines being connected in parallel by conducting columns to a memory that ensures the transfer towards a read-out register of the charge-signal (QS) of a single line and which ensures the transfer towards a drain of the charge-noise (QB) present on the columns prior to the intake of the charge-signal, wherein the line memory (4) comprises a series of intermediary capacitances (C1), each capacitance being connected on either side of the columns to switch-over means leading the contents of the intermediary capacitances either towards the drain or towards the read-out register.

4,684,994
TELEVISION CAMERA TUBE WITH HONEYCOMB GRID ELECTRODE

Gerardus A. H. M. Vrijssen, and Aart A. Van Gorkum, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 13, 1986, Ser. No. 818,154

Claims priority, application Netherlands, Feb. 7, 1985, 8500340

Int. Cl.[4] H01J *29/02, 29/06*

U.S. Cl. 358—217 **5 Claims**

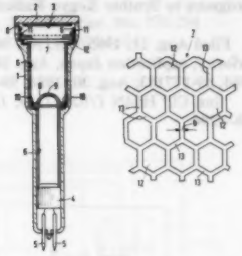
1. A television camera tube comprising:

an evacuated envelope;

an electron gun in the envelope for generating an electron beam;

a target in the envelope, said target bearing a photosensitive

layer, said target arranged to be scanned by the electron beam; and



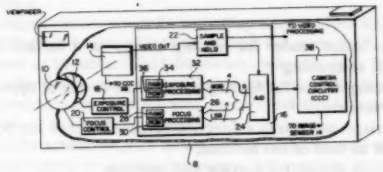
a grid electrode arranged near but spaced from the target between the electron gun and the target, said grid electrode having a plurality of regular hexagonal apertures therein forming a honeycomb structure.

4,684,995

SIMULTANEOUS EXPOSURE/FOCUS CONTROL IN A VIDEO CAMERA USING A SOLID STATE IMAGE SENSOR

Hans P. Baumeister, Churchville, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 20, 1986, Ser. No. 876,630
Int. Cl.[4] H04N *5/16*; G03B *3/00*
U.S. Cl. 358—227 **5 Claims**



1. An exposure measurement and focus detection apparatus for a video imaging system comprising:

a. image sensing means having a plurality of pixel elements that generate electrical signals proportional to the light incident on said pixel elements,

b. digital conversion means for converting the electrical signals generated from said pixel elements to a digital word having n bits, said digital word having at least two segments,

c. focus processing means, coupled to said digital conversion means, for receiving a first segment of said digital word and determining if said video imaging system is focused, and

d. exposure processing means, coupled to said digital conversion means, for receiving a second segment of said digital word and determining the exposure of said video imaging system.

4,684,996

VIDEO PROJECTOR WITH OPTICAL FEEDBACK

Hans-Peter Baumeister, Churchville, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 25, 1986, Ser. No. 900,211
Int. Cl.[4] H04N *5/74, 3/10*
U.S. Cl. 358—231 **19 Claims**

1. A video beam projector system, comprising:

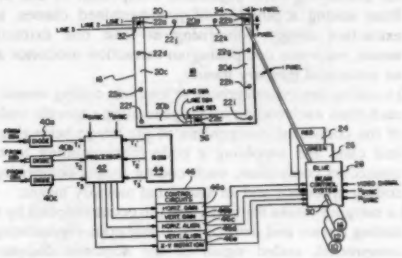
at least one beam generator adapted to generate an illuminating beam;

a projection viewing screen;

beam deflection control means for modulating said beam in synchronism with an incoming video signal, and for deflecting said beam so as to raster-scan said screen with a projected video image field on at least a portion of said screen;

opto-electronic sensing means for sensing the actual time of arrival of said beam at particular points on said screen;

means for comparing said actual beam arrival time at each of said screen points with a predetermined beam arrival time;



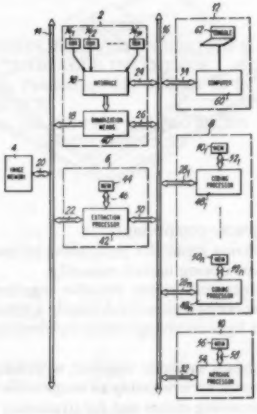
means connected to said beam control means for re-aligning said projected video image with respect to said screen in response to said comparing means so as to reduce any differences between said actual and predetermined beam arrival times, wherein said opto-electronic sensing means comprises a single sensor at each given one of said particular screen points, so as to minimize the number of such single sensors.

4,684,997

MACHINE FOR THE READING, PROCESSING AND COMPRESSION OF DOCUMENTS

Francoise Romeo, 23 rue Henri Bourrelier, 91370 Verrieres-le-Buisson, and Pascale Joly, 42 rue de la Colonie, 75013 Paris, both of France

Filed Mar. 25, 1986, Ser. No. 844,005
Claims priority, application France, Mar. 29, 1985, 85 04828
Int. Cl.[4] H04N *1/40*
U.S. Cl. 358—263 **8 Claims**



1. A machine for the reading, processing and compression of documents comprising:

(a) reading means for the acquisition of documents comprising a plurality of reading members and an interface, each

reading member being specific to a type of document and supplying an electronic image signal of an acquired document, the interface comprising a plurality of inputs, each connected to a reading member for receiving an electronic image signal;

(b) an image memory for storing an image supplied from the reading means;

(c) an extraction device for determining the connected components of an image memorized in the image memory, and for classifying each connected component in one class from among a plurality of predetermined classes, said extraction device comprising at least one extraction means, each one comprising an extraction processor and an associated memory means;

(d) a coding device comprising at least one coding means for each class, each coding means generating a specific coding of the connected components of the image belonging to said class and supplying a code corresponding to said connected component, each coding means comprising a coding processor and an associated memory means;

(e) a merging means for gathering the codes supplied by the coding device and developing a final code representing a compressed, coded signal of the acquired document, wherein said machine comprises:

(f) an image bus for the transmission of at least parts of a digital image, said image bus connecting the image memory, the reading means, and the extraction device; and

(g) a communication bus for the transmission of control signals between the control means, the reading means, the extraction device, the coding means and the merging means, and for the transmission of coded signals representing connected components between the extraction device, the coding means, and the merging means.

4,684,998

IMAGE READER SUITABLE FOR MANUAL SCANNING

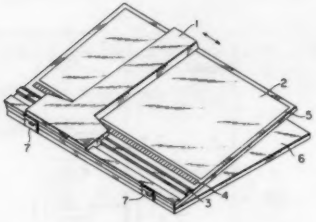
Hiroshi Tanioka, Tokyo, and Noriyoshi Ueda, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 7, 1984, Ser. No. 618,251

Claims priority, application Japan, Jun. 15, 1983, 58-108072; Jun. 15, 1983, 58-108073; Jun. 15, 1983, 58-108074

Int. Cl.[4] H04N *1/10, 1/40, 1/04, 1/00*

U.S. Cl. 358—293 **20 Claims**



1. An image reader comprising:

first light-receiving means for performing an image reading operation upon being moved manually;

second light-receiving means movable together with said first light-receiving means for detecting a reading position of said first light-receiving means by reading an optical pattern;

light source means movable together with said first light-receiving means for irradiating an image to be read by said first light receiving means and for irradiating said optical pattern to be read by said second light-receiving means; and

control means for controlling the image reading operation of said first light-receiving means in accordance with an output from said second light-receiving means.

4,684,999

IMAGE READER

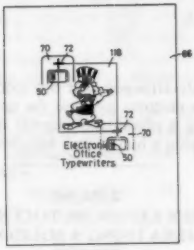
Kenji Sakakibara, Ichinomiya; Tetsuo Harano, Inazawa; Yasuhito Bandai, Nagoya, and Eiichi Ohta, Handa, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Aug. 21, 1985, Ser. No. 768,107

Claims priority, application Japan, Aug. 24, 1984, 59-177182; Aug. 24, 1984, 59-177183; Aug. 30, 1984, 59-182425

Int. Cl.[4] H04N *1/024, 1/14, 1/387*

U.S. Cl. 358—294 **13 Claims**



1. An image reader for reading images on a surface of a medium, comprising:

a feeding device for feeding the medium in one of opposite directions;

a carriage movable in a direction perpendicular to the direction of feed of the medium;

a driving device for moving said carriage;

a reading head mounted on said carriage for reading the images on the surface of the medium;

area-setting means for setting a reading area on the surface of the medium within which the images are read by said reading head, said reading area being set while said reading head is moved relative to said medium by said feeding and driving devices; and

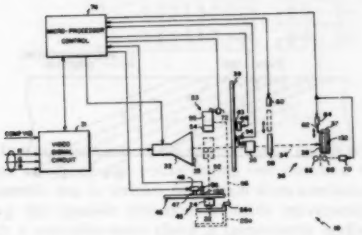
reading control means for controlling said feeding and driving devices and said reading head, to cause said reading head to read the images within said reading area while the reading area is scanned by said reading head,

said area-setting means comprising memory means for storing point-data representing a plurality of points defining said reading area, a first operator-controlled device operable to set said reading area, first area-setting control means for storing into said memory means the point-data representing each one of said plurality of points, when said reading head is positioned at said each one of the plurality of points one after another by said first operator-controlled device, a second operator-controlled device operable after the point-data representing a specific one of said plurality of points has been determined, and second area-setting control means for determining, upon operation of said second operator-controlled device, the point-data representing the other points of said plurality of points, according to a predetermined relative positional relation between said specific point and said other points, and storing the determined point-data into said memory means.

4,685,000
INHIBITION OF EXPOSURE IN A VIDEO PRINTER UPON LOSS OF COLOR FILTER SYNC

Harold J. Barrett, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 16, 1985, Ser. No. 776,234
Int. Cl.[4] H04N 5/84
U.S. Cl. 358—332 9 Claims



1. Apparatus for producing a color photographic copy of a color video signal comprising:

monochrome electronic display means for displaying an image of a video signal;

an exposure station located along a first optical path from said display means at which is positioned a photographic element;

video signal circuit means for providing a color video signal constituting frames of interlaced odd and even fields repeated at broadcast field frequency, wherein each field includes three concurrent color component video signals respectively representing first, second and third primary colors of a color field image;

selectively actuatable gate means, electrically coupling said circuit means to said display means, for applying to said display means only one color component signal from each field of said three concurrent color component signals provided by said circuit means;

a first rotatable filter having first, second and third primary color filters sequentially movable into said optical path;

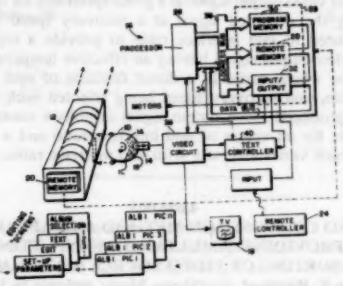
first means for continuously rotating said first filter;

control means including a microprocessor (1) for synchronizing the continuous rotation of said first filter by said first rotating means with said field frequency of said color video signal; (2) for exposing a photographic element positioned at said exposure station by actuating said gate means in response to detection of said first primary color filter being moved into said first optical path to apply to said electronic display means a sequence of six consecutive color component video field signals constituting odd and even fields respectively of each of said first, second and third primary colors, in the color sequence of first primary color, second primary color, third primary color, first primary color, second primary color, third primary color, as respective corresponding color filters of said first filter are sequentially rotated into said optical path, such that said display means produces a sequence of six consecutive monochrome field images which are filtered by respective corresponding primary color filters to expose said element to a sequence of six color field images corresponding a full frame of a color video image; and (3) for inhibiting the exposure of said photographic element when said first filter is not rotated in synchronism with said field frequency of said video signal.

4,685,001
METHOD FOR RETRIEVING UNEDITED VIDEO STILL PICTURES

William A. Martin, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 24, 1984, Ser. No. 644,099
Int. Cl.[4] G11B 7/00
U.S. Cl. 358—342 3 Claims



1. An editing method for further arranging the display of a plurality of video still pictures already arranged in part for display by subject-matter categories according to image content, the pictures being prerecorded upon video tracks on a plurality of video disks with the editing information pertaining to category assignment being stored in a memory associated with the disks, said method comprising the steps of:

excluding one or more categories;

selecting a video still picture unassignaed to said one or more excluded categories by reference to the memory associated with the disks;

reproducing a video signal from a video track corresponding to the selected picture;

generating a picture display from the video signal;

displaying the subject-matter categories into which the selected picture may be arranged;

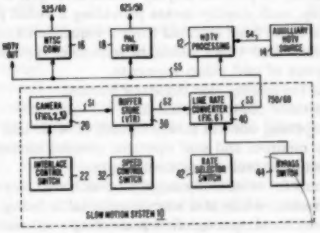
assigning the selected picutre to one or more of the displayed categories; and

storing the subject-matter category assignments in the memory associated with the disks.

4,685,002
SLOW MOTION TELEVISION SYSTEM HAVING VARIABLE INTERLACE

Kerns H. Powers, Princeton, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Feb. 13, 1985, Ser. No. 701,208
Int. Cl.[4] H04N 5/92
U.S. Cl. 360—9.1 10 Claims



1. A slow motion television system, comprising:

camera means having an output for providing a video output

signal having a substantially constant line rate and having an interlace ratio;

interlace control switch means coupled to said camera means for varying said interlace ratio without substantially altering said line rate for causing said video output signal of said camera means to exhibit a substantially constant bandwidth independent of variations in said interlace ratio; and

storage means coupled to said camera means for recording said video output signal at a given speed and for reproducing the recorded signal at a recovery speed inversely related to said interlace ratio to provide a reproduced video output signal having an effective temporal resolution which varies as a direct function of said interlace ratio, said recovery speed being selected such that said reproduced video output signal exhibits a constant field rate for all values of said interlace ratio and a line rate which varies inversely with said interlace ratio.

4,685,003

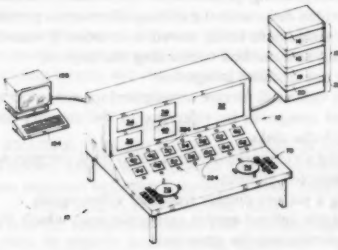
VIDEO COMPOSITION METHOD AND APPARATUS FOR PROVIDING SIMULTANEOUS INPUTTING AND SORTING OF VIDEO SOURCE MATERIAL

William F. Westland, Southboro, Mass., assignor to Lex Computing & Management Corporation, Keene, N.H.

Filed Dec. 2, 1983, Ser. No. 556,533

Int. Cl.[4] H04N *5/76;* **G11B** *27/02, 27/36*

U.S. Cl. 360—14.1 **6 Claims**



1. Apparatus for composing image source material stored on at least one image storage, said source material being composed of a sequence of stored frames representing a time sequential visual image, sequences of said frames being associated to form a video segment, said composing apparatus comprising

means for inputting said source material and for recording said source material in said storage medium,

means for segmenting said source material as it is being input,

means for digitizing frames of said source material, as said source material is being input, each segment having associated therewith at least one digitized frame,

a plurality of pictoral display means arranged in an ordered array, each display means providing a visual presentation of a video label selected from a sequence of said digitized frames, said video labels, in sequence, representing a sequence of said video segments,

means for storing said digitized frames,

an operator control means, and

a composing control means operative with said frame storage medium and said operator control means, said composing control means comprising

means for selectively supplying each said pictorial display means, while said source material is being input, with electrical data signals representing a selected one of said sequence of labels, and

means responsive to said operator control means for sorting the label sequence displayed by said plural pictorial display means while said source material is being input.

4,685,004

ROTARY HEAD TYPE PCM RECORDING AND REPRODUCTION METHOD AND SYSTEM

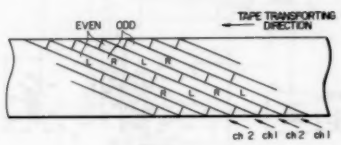
Hiroaki Takahashi, Tokyo; Masaharu Kobayashi; Takaharu Noguchi, both of Yokohama; Toshifumi Shibuya, and Takao Arai, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 15, 1985, Ser. No. 712,094

Claims priority, application Japan, Mar. 19, 1984, 59-50915

Int. Cl.[4] G11B *5/00, 5/09*

U.S. Cl. 360—32 **9 Claims**



1. A signal recording/reproducing method in a rotary head type PCM recording/reproducing apparatus which comprises a plurality of recording and reproducing heads, a rotatable cylinder having said heads mounted thereon, an analog-to-digital (A/D) converter for sampling an audio signal and converting it to a digital signal, a digital-to-analog (D/A) converter for converting a digital signal to a analog signal, a recording signal processing circuit for adding an error detecting and correcting code to the digital signal, and a reproduced signal processing circuit for performing decoding and other processings of the reproduced signal, wherein the output signal from said recording signal processing circuit is recorded on a recording tape or the signal recorded on said tape is reproduced, said method comprising, in recording mode, the steps of:

(a) storing the odd-numbered sample data and the even-numbered sample data discriminatively from the sampled digital signal outputted from said A/D converter;

(b) reading selectively units of said stored data each corresponding to a completed data set of a predetermined time duration outputted from said A/D converter, said data units being supplied to said plural heads to be recorded on said tape in such a manner that the odd-numbered data and the even-numbered data are recorded alternately on a plurality of tracks of said tape or alternatively recorded on a preceding half and a succeeding half, respectively, of each of said tracks;

(c) creating an error detecting and correcting code for the data to be recorded on the track allotted thereto on the basis of the stored data to be arrayed on said allotted track before the recording of said read data on the tape, and recording said error detecting and correcting code on the tape together with the associated stored data; and

comprising, in reproducing mode, the steps of:

(d) storing the data signals reproduced from said recording tape through said plural heads as the odd-numbered data and the even-numbered data;

(e) reading selectively said reproduced and stored data for converting to the analog signal to thereby reconstitute the original audio signal; and

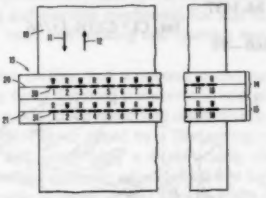
(f) checking the reproduced signal supplied from said plural heads as to whether any of said plural tracks drops out, and upon detection of the drop-out of the track, creating a correcting signal for the lost data to be otherwise present on said drop-out track through data interpolation based on the output data reproduced from the other tracks.

4,685,005

TWO-MODULE-READ, READ-AFTER-WRITE, BI-DIRECTIONAL TAPE DRIVE

Davis S. Fields, Jr., Tucson, Ariz., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 18, 1983, Ser. No. 514,994
Int. Cl.[4] G11B *5/09, 15/12, 5/187*
U.S. Cl. 360—53 13 Claims



1. In a bi-directional media drive wherein data is written on certain odd-numbered tracks during one direction of media movement, and is written on certain even-numbered tracks during the opposite direction of media movement, and in which a read-after-write check is immediately performed on written data, the improvement comprising:

two data-transducing head modules, each of which includes one transducing gap line extending normal to the direction of media movement, said modules being non-movable relative each other; and

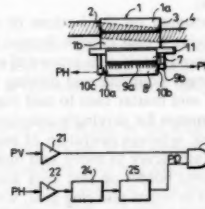
each gap line including alternating write and read gaps, the write gaps of one module being aligned in the direction of media movement with the read gaps of the other module.

4,685,006

MAGNETIC RECORDING-REPRODUCING DEVICE

Kazuo Sato, Kakuda, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed May 7, 1986, Ser. No. 860,531
Claims priority, application Japan, May 7, 1985, 60-96383
Int. Cl.[4] G11B *15/14*
U.S. Cl. 360—64 7 Claims



1. A magnetic recording-reproducing device for recording a signal on a magnetic tape and/or reading out a signal from the magnetic tape to reproduce the same while running the magnetic tape in contact with a rotary drum having at least two heads, comprising

a frequency generator for generating a pulse train having a frequency proportional to the rotating speed of said rotary drum,

a pulse generating unit for generating a pulse indicating the direction/position of rotation of each of said heads each time said rotary drum rotates a certain angle of rotation,

a delay circuit for delaying the phase of the pulse supplied from said pulse generating unit, and

a gate circuit for computing the logical product of the pulse supplied from said delay circuit and the pulse supplied from said frequency generator,

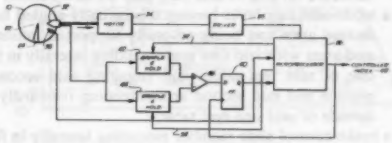
wherein the pulse supplied from said gate circuit is treated as a pulse indicating a true head position.

4,685,007

DISK DRIVE WITH TRACK ZERO LOCATION SYSTEM

Ara W. Nazarian, Hollywood, and Donald G. Stupeck, Canoga Park, both of Calif., assignors to Computer Memories, Incorporated, Chatsworth, Calif.

Filed Dec. 21, 1983, Ser. No. 564,021
Int. Cl.[4] G11B *21/08, 5/55*
U.S. Cl. 360—78 8 Claims



1. a magnetic disk system comprising:

an information carrying disk having a plurality of concentric data tracks, said disk having a single sector of reference track information thereon providing an indication of the location of a reference track with respect to the other data tracks, the sector of reference track information including a first signal pattern recorded on each track to one side of the reference track and a second signal pattern different from the first signal pattern recorded on the reference track and each track o the other side of the reference track;

transducer means for reading information from the disk;

actuator means for radially moving the transducer means with respect to the tracks of the disk;

detection means for determining, in response to the reading of reference track information by the transducer means, when the transducer means is positioned at the reference track; and

control means for controlling the actuator means (a) first in response to the detection means to move the transducer means across the tracks of the disk to locate the reference track and (b) second in an open loop fashion after the detection means has determined that the transducer means is positioned at the reference track to move the transducer means to a desired data track.

4,685,008

MAGNETIC RECORDING AND/OR REPRODUCING APPARATUS WITH TAPE LOADING AND REEL BRAKING MECHANISMS WHICH ARE CONTROLLED IN COMMON

Masao Ohyama, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jun. 18, 1985, Ser. No. 746,083
Claims priority, application Japan, Jun. 20, 1984, 59-126835
Int. Cl.[4] G11B *5/027, 15/00*
U.S. Cl. 360—85 9 Claims

1. An apparatus for recording and/or reproducing signals on a magnetic tape wound on supply and take-up reels in a cassette, comprising:

laterally spaced apart, rotary supply and take-up reel tables for rotatably supporting said supply and take-up reels, respectively, within the cassette when the latter is operatively positioned;

a magnetic head assembly spaced rearwardly from said rotary reel tables and being operative to magnetically record or reproduce signals on the tape when the latter is disposed in a predetermined path leading out of the operatively positioned cassette;

tape guide means movable between an inoperative position in which said guide means are engageable with the tape

within the operatively positioned cassette and an operative position in which said guide means withdraw the tape from the cassette and dispose the withdrawn tape in said predetermined path;

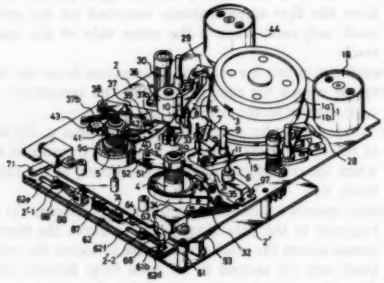
a single control motor;

a cam gear rotatably couled with said control motor to be driven by the latter and having first and second cam portions, said cam gear being positioned generally between said reel tables and said head assembly;

loading and unloading means engaged with said first cam portion and moving said tape guide means between said inoperative and operative positions in response to predetermined turning of said cam gear by said control motor;

a mode-selecting lever having substantially angled first and second arms and being pivotally supported intermediate said arms with said first arm extending laterally in back of one of said reel tables and engaging said second cam portion and said second arm extending forwardly at the outside of said one reel table;

a brake-control slide member extending laterally in front of said reel tables and being connected, at one end, to said



second arm of the mode-selecting lever so that said slide member is longitudinally displaced in a lateral direction in response to pivoting of said mode selecting lever by said second portion of the cam gear;

brake members for the supply and take-up reel tables, respectively, and being actuable by the longitudinal displacement of said brake-control slide for selectively engaging said disengaging the respective reel tables;

a rotatably driven capstan;

a pinch roller;

support means for said pinch roller pivotally mounted at the outside of the other of said reel tables for movement of said pinch roller between an inoperative position remote from said capstan and an operative position in which said pinch roller is pressed against said capstan with the tape in said path therebetween; and

actuating means for said pinch roller connected with said brake-control slide member at the other end of the latter and being operative on said support means for the pinch roller to urge the latter to said operative position in response to predetermined displacement of said brake-control slide member.

4,685,009

CASSETTE LOADING APPARATUS FOR VIDEO CASSETTE RECORDER

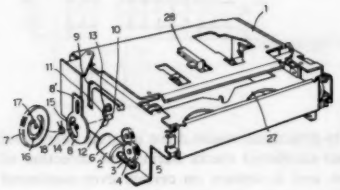
Seong K. Min; Yong J. Kim; Hee W. Lee, and Chul G. Chun, all of Suwon, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Kyungki-do, Rep. of Korea

Filed Feb. 21, 1985, Ser. No. 703,615

Claims priority, application Rep. of Korea, Feb. 27, 1984, 84-1584; Feb. 27, 1984, 84-1586; Feb. 27, 1984, 84-1587; Mar. 20, 1984, 84-1437

Int. Cl.[4] G11B *15/66*

U.S. Cl. 360—95 **5 Claims**



1. A cassette loading apparatus for placing a cassette holder having a magnetic tape held therein onto a deck and for driving a ring gear to operate means for pulling tape from the cassette and for loading the tape onto an upper drum for reproduction, said apparatus comprising:

a housing having formed therein a right-angled opening;

an interlocking pin fixed on said cassette holder and extending through said right-angled opening;

an axis on said housing;

an arm lever mounted for rotation about said axis and drivingly engaging said interlocking pin;

a placement gear mounted for rotation on said axis;

means drivingly coupling said placement gear to said arm lever, wherein rotation of said placement gear causes motion of said interlocking pin in said right-angled opening;

a motor mounted on said housing;

a worm mounted on a shaft of said motor;

gearing means for drivingly coupling said worm to said placement gear;

a master cam mounted on the bottom of said deck, said master cam having a cam groove formed therein;

a driving pin received in said cam groove of said master cam;

gear means drivingly coupling said driving pin received in said groove of said master cam to said ring gear; and

connecting gear means for drivingly coupling said worm to said master cam, wherein operation of said motor causes motion of said arm lever to move said interlocking pin to place said cassette holder on said deck and further drives said master cam to rotate said ring gear, whereby said tape is pulled from said cassette and loaded onto said upper drum for reproduction after said cassette holder is placed on said deck.

4,685,010

LOCKING AND EJECTING DEVICE FOR A RECORDING AND REPRODUCING APPARATUS FOR MAGNETIC DISCS

Sergio Tronzano, Caluso, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Apr. 4, 1985, Ser. No. 719,882

Claims priority, application Italy, Apr. 5, 1984, 67332 A/84

Int. Cl.[4] G11B *17/02, 17/04*

U.S. Cl. 360—97 **6 Claims**

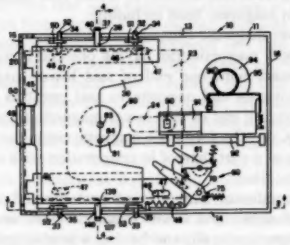
1. A recording and reproducing apparatus for a magnetic disc which is contained in a protective case, comprising a drive member which is engageable with said magnetic disc to rotate it within its protective case; a magnetic head; a suppport unit

for supporting the disc case, means for guiding the support unit between a first position wherein a disc case can be inserted into and removed from the support unit, and a second position in which the disc is engageable with the drive member and cooperative with the magnetic head; and an actuating slider which is slidable between an insertion position and an operative position along a given direction and having means defining the first and the second position of the support unit corresponding with said insertion position and said operative position, respectively; and a locking and ejecting mechanism for said actuating slider and said disc case, said locking and ejecting mechanism comprising:

a first arrest surface and a second arrest surface of said actuating slider disposed transverse to said given direction and along said given direction, respectively;

an intermediate lever urged by a first spring toward a first position and comprising a first locking element and a second locking element, wherein said first locking element is engageable with the second arrest surface of said actuating slider in the operative position of said actuating slider to arrest said intermediate lever in a second position against the action of said first spring;

a second spring for urging said actuating slider toward its operative position, wherein the first locking element of said intermediate lever is engageable with the first arrest surface of said actuating slider to arrest it in said insertion



position against the action of said second spring, and wherein said first locking element releases said first arrest surface in the second position of said intermediate lever; and

a release lever held at rest in the trajectory of said disc case, wherein said release lever comprises a cooperation element cooperative with said intermediate lever to move it beyond its second position upon insertion of said disc case in the support unit, whereby causing releasing of the actuating slider toward its operative position, locking of said intermediate lever in its second position, and positioning of the support unit in its second position;

wherein the second locking element of said intermediate lever is engageable with said release lever to arrest it in a locked position when the intermediate lever is arrested in its second position, whereby arresting the release lever in said locked position; and

wherein said second arrest surface is configured to disengage said first locking element for releasing the intermediate lever from said second position in response to sliding of said actuating slider to its insertion position, whereby causing the intermediate lever to arrest against said actuating slider in said insertion position against the action of said second spring and said release lever to eject said disc case from the support unit jointly with the return of the support unit to its first position.

4,685,011

RECORDING AND REPRODUCING APPARATUS INCLUDING A CASSETTE LOADING DEVICE

Motohiro Shimaoka, and Yukio Saito, both of Furukawa, Japan, assignors to Alps Electric Co., Japan

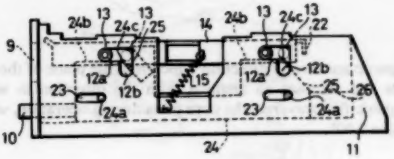
Filed Feb. 8, 1984, Ser. No. 578,277

Claims priority, application Japan, Feb. 9, 1983, 58-16680[U]

The portion of the term of this patent subsequent to Feb. 11, 2003, has been disclaimed.

Int. Cl.⁴ G11B *5/012*

U.S. Cl. 360—97 **5 Claims**



1. A recording and reproducing apparatus having a front panel with an opening for insertion of a disk cartridge to be loaded or unloaded to or from an operative position for recording and reproducing in the apparatus, comprising:

a frame in the apparatus provided with guide holes each of which consists of a rearwardly extending horizontal portion and a downwardly extending vertical portion;

a cartridge holder for receiving a disk cartridge therein, said cartridge holder having rollers disposed on side portions thereof in engagement with said holes and being movable with said rollers guided in said guide holes horizontally rearward along said horizontal portions and vertically downward to the operative position along said vertical portions of said guide holes when said disk cartridge is inserted in the apparatus;

movable cam members having horizontal portions, rearwardly and downwardly inclined portions and protrusions at the intersection of said horizontal portions and inclined portions, each said cam member being in abutting engagement with a respective roller of said cartridge holder such that said horizontal portion of the cam member is moved relative to the roller when the roller is moved horizontally in the guide hole, said protrusion portion provides a physical contact as the roller is moved over said protrusion portion, and said inclined portion is moved relative to the roller so as to move the cam member frontwardly when the roller is moved vertically downward in the guide hole to the operative position or to push the roller vertically upward from the operative position when an ejection member is actuated to move the cam member rearwardly; and

resilient members in resilient contact with said cam members for biasing said protrusion portions of said cam members frontwardly toward said roller when said rollers are located in said horizontal portions of said guide holes.

4,685,012

MAGNETIC HEAD WITH ANISOTROPY IN PLANE OF CORE PORTS

Hendrik J. De Wit; Marcel Brouha; Ulrich E. Enz; Kornelis Jager; Albertus J. C. Van Der Borst, and Gijsbertus W. Turk, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 30, 1985, Ser. No. 793,027

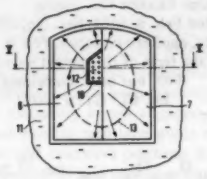
Claims priority, application Netherlands, Nov. 27, 1984, 8403595

Int. Cl.⁴ G11B *5/127, 5/133, 5/147*

U.S. Cl. 360—125 **4 Claims**

1. A magnetic head having a core of a magnetizable material around a part of which a coil is provided, and comprising two laminar core parts of an amorphous ferromagnetic metal, said

parts being coplanar and defining a transducing gap therebetween, characterized in that the core parts are of a magnetically anisotropic, amorphous ferromagnetic metal and have a



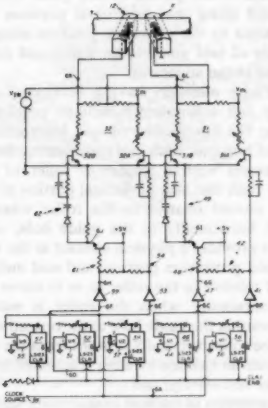
magnetic anisotropy direction which is in the plane of the core parts and encloses an angle α with the direction in which magnetic flux traverses the core parts during operation, where $45° \leqq \alpha \leqq 90°$.

4,685,013

MAGNETIC TAPE HEAD ALIGNMENT SYSTEM

Kyriacos Joannou, Wayland, and Daniel C. Downs, Framingham, both of Mass., assignors to Pericomp Corp., Natick, Mass.

Filed Aug. 22, 1985, Ser. No. 768,317
Int. Cl.[4] G11B *21/00, 27/36, 21/10*
U.S. Cl. 360—121 **10 Claims**



1. A magnetic tape calibration head for producing a test tape and comprising;

a first write head having a linear head gap extending in a first direction,

a second write head having a linear head gap extending in a second direction,

said first and second write heads being supported in adjacent position,

a multi-track read head disposed adjacent one of said write heads and extending normal to the tape travel axis direction,

said first and second write heads positioned so that their head gaps converge and both extend at a small angle to the normal,

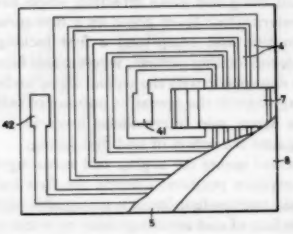
both said first and second write heads being single gap heads, the length of said write head gaps each being substantially equal to the length of the multi-track read head.

4,685,014

PRODUCTION METHOD OF THIN FILM MAGNETIC HEAD

Masanobu Hanazono; Shinichi Hara; Hirosi Akiyama, all of Hitachi; Masaaki Hayashi; Harunobu Saitoo, both of Odawara, and Takumi Kurisu, Hamada, all of Japan, assignors to Computer Basic Technology Association, Tokyo, Japan

Filed Jul. 29, 1982, Ser. No. 403,015
Claims priority, application Japan, Aug. 14, 1981, 56-126698
Int. Cl.[4] G11B *5/147*
U.S. Cl. 360—126 **25 Claims**



1. A production method of a thin film magnetic head, said thin film magnetic head including:

a lower magnetic film;

an upper magnetic film having one end thereof coming into contact with one end of said lower magnetic film and having an end opposite to said one end facing a corresponding end of said lower magnetic film via a magnetic gap, thereby forming a magnetic circuit having a magnetic gap at a part thereof in cooperation with said lower magnetic film;

coil conductor films having part thereof passing between said upper and lower magnetic films and crossing said magnetic circuit, and having a predetermined number of windings; and

an insulating member made of an organic material electrically insulating said coil conductor films from one another and said coil conductor films from at least said upper magnetic film;

said upper and lower magnetic films, said coil conductor films and said insulating member being formed in lamination by thin film technique;

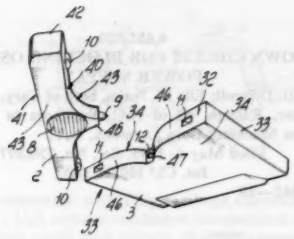
said method characterized in that a flattening coating made of a further organic material, having a surface, is formed on a portion of said insulating member at which said upper magnetic film is to be formed, wherein said portion of said insulating member at which the upper magnetic film is to be formed has a concavo-convex surface before etching of said portion, the flattening coating being formed, before the formation of said upper magnetic film, in such a thickness that the surface of said flattening coating can be flattened; and then etching is performed to etch said flattening coating and parts of said insulating member so as to expose the entire portion of said insulating member on which said upper magnetic film is to be formed such that the surface of said portion is flattened, the portion, ranging from the surface of said flattening coating to said insulating member, being etched and changed into a substantially flat surface having a height up to 0.1 μm by plasma-assisted etching technique under such a condition where the etching speed of said flattening coating is substantially equal to that of said insulating member.

4,685,015

CLEANER CARTRIDGE, IN PARTICULAR FOR CLEANING AUDIO AND VIDEO TAPE RECORDERS AND PLAYERS

Giovanni Zago, Via Aprilis, 41, San Quirino (Providence of Pordenone), and Giovanni Prataviera, Via Caorle, 4, Pordenone, both of Italy

Filed Aug. 5, 1985, Ser. No. 762,464
Claims priority, application Italy, Aug. 21, 1984, 83402 A/84
Int. Cl.[4] G11B *5/41;* **A47L** *25/00*
U.S. Cl. 360—128 **10 Claims**



1. A cleaner cartridge for cleaning audio and video tape recorders and players, comprising a cartridge body and a detergent liquid reservoir, said cartridge body having a substantially box-like flattened configuration having at least one longer, thin front face, three thin lateral delimitation faces including a longer, thin rear wall extending opposed at a distance from said thin front face and two shorter, thin side walls extending at a distance to each other between said thin front face and said thin rear wall, and two larger upper and lower walls extending parallel to each other between said thin front and thin lateral delimitation faces, said thin rear, thin side and larger upper and lower walls separating a cartridge body interior from a cartridge body exterior, and said detergent liquid reservoir having a hollow box-like configuration for accomodating therein a detergent liquid, said hollow box-like configuration including at least a thin front attachment wall, an opposed thin rear delimitation wall, two thin lateral delimitation walls extending at a distance from each other, and two upper and lower delimitation walls extending parallel to each other between said front attachment, rear delimitation, and lateral delimitation walls, said front attachment wall of said detergent liquid reservoir and at least one of said thin lateral delimitation faces having mutually fitting shape and cooperating removable connection means for removably securing said detergent liquid reservoir to said cartridge body at said cartridge body exterior, said substantially box-like configuration of said cartridge body and said hollow box-like configuration of said detergent liquid reservoir defining, in a mutually connected condition, a substantially parallelepipedal shape with outer dimensions correspondent to usual tape cassettes, with said cartridge body extending adjacent to said detergent liquid reservoir.

4,685,016

DOOR OPERATING MECHANISM FOR A CASSETTE USABLE IN A MAGNETIC TAPE RECORDER

Antoni S. Baranski, San Carlos, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Aug. 20, 1985, Ser. No. 767,577
Int. Cl.[4] G11B *23/087, 15/665*
U.S. Cl. 360—132 **11 Claims**

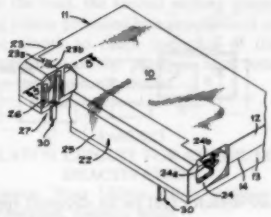
1. A tape cassette for holding a supply of tape at a supply position for transport across an access opening to a take-up position, the cassette insertable into a tape transport means, said cassette comprising:

a door assembly positioned at said access opening and having a closed-position for protecting said tape, and being pivotable to an opened position to provided access to said tape;

biasing means for biasing said door assembly to said closed position;

a cam path provided in said cassette having a closed position and an opened position;

a cam follower provided on said door assembly for engaging said cam path for guiding said door assembly between said closed and opened positions and positioned for engagement by external opening means provided on the tape transport means; and



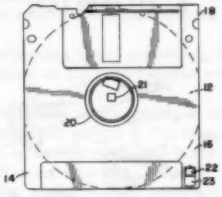
a cam follower latch for maintaining said cam follower in said closed position, the cam path, the cam follower and the cam follower latch positioned to cooperate with the external opening means, which first releases said cam follower latch, then engages said cam follower to pivot the associated door assembly from the closed position to the opened position, and thereafter retains said door assembly in the opened position.

4,685,017

WRITE/PROTECT TAB ASSEMBLY FOR A FLOPPY DISC JACKET AND METHOD FOR ASSEMBLING SAME

Stephen G. Swinburne, Scarborough, and Anthony L. Gelardi, Kennebunkport, both of Me., assignors to Shape Inc., Biddeford, Me.

Filed Jun. 11, 1985, Ser. No. 743,388
Int. Cl.[4] G11B *23/02, 15/04, 19/04*
U.S. Cl. 360—133 **20 Claims**



1. A write/protect tab assembly for a floppy disc jacket, comprising:

(a) a substantially planar jacket base;

(b) a write/protect tab slidably mounted for movement from a first position to a second position parallel to the plane of the jacket base in a tab pocket formed in the jacket base; and

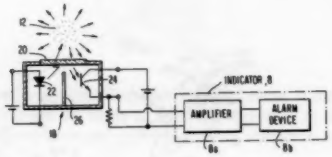
(c) means formed on the jacket base and the tab for encapturing the write/protect tab relative to the jacket base to prevent the tab from moving in a direction substantially perpendicular to the plane of the jacket base.

4,685,018

ARC DETECTOR FOR GAS INSULATED ELECTRICAL APPARATUS

Shoji Tada, and Koji Ibuki, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 23, 1986, Ser. No. 877,583
Claims priority, application Japan, Jul. 2, 1985, 60-147441
Int. Cl.[4] H02H *5/00*
U.S. Cl. 361—1 **7 Claims**



1. An arc detector (**18**) for an electrical apparatus, comprising:

(a) a closed metal vessel (**1**),

(b) a metal electrical device (**5**) disposed within the vessel and spaced from inner surfaces thereof by insulating means (**51**),

(c) an insulating gas filling a space within the vessel between the inner surfaces thereof and the electrical device, wherein the occurrence of an arc between the electrical device and the vessel produces a fine reflective powder (**12**) in said space due to electrochemical reactions between said insulating gas and the metal of said vessel and said electrical device,

(d) means (**22**) for directly irradiating said space within the vessel with light;

(e) means (**24**) for directly receiving a portion of said light reflected from fine powder (**12**) produced upon the occurrence of an arc whereby the amount of light received by said means for receiving is increased; and

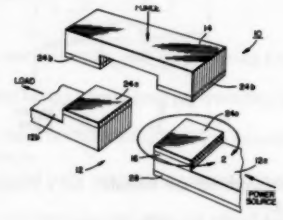
(f) an indicator (**8**) responsive to an output from said light receiving means for signalling the occurrence of an arc.

4,685,019

CONTROLLED ELECTRICAL CONTACTS FOR ELECTRICAL SWITCHGEAR

Eric Needham, Cumberland, R.I., assignor to Engelhard Corporation, Menlo Park, N.J.

Filed Apr. 29, 1985, Ser. No. 727,991
Int. Cl.[4] H02H *3/033*
U.S. Cl. 361—2 **40 Claims**



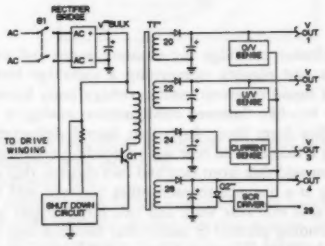
1. An improved electrical switch for current interruption comprising a stationary contact and a separable moving contact movable in a predetermined plane of motion in and out of engagement with said stationary contact to interrupt the flow of current therethrough, the improvement comprising a semiconductor switching assembly on a contact surface of said electrical switch, said semiconductor switching assembly having a gate electrode for controlling electrical flow therethrough.

4,685,020

SHUTDOWN CIRCUIT FOR BLOCKING OSCILLATOR POWER SUPPLY

Carleton D. Driscoll; Elie M. Najm, both of Cary, and Manfred Waechter, Raleigh, all of N.C., assignors to International Business Machines Corp., Armonk, N.Y.

Filed May 6, 1985, Ser. No. 730,897
Int. Cl.[4] H02H *3/20*
U.S. Cl. 361—18 **2 Claims**



1. In a switching power supply having a switching transistor for controlling current through the primary winding of a power transformer and a plurality of secondary windings being arranged on the core of said power transformer said secondary windings operable for supplying current to attached loads, a circuit arrangement for protecting said power supply from electrical faults comprising:

shut down circuit means coupled to said switching transistor and operable for shutting down the power supply when the flow of current therethrough exceeds a predetermined limit;

first circuit means coupled to said secondary windings and operable for sensing a fault condition in said secondary windings and to generate electrical signals representative of said sensed fault, said first circuit means including a positive overvoltage (O/V) detector circuitry and a negative O/V detector circuitry with the negative O/V detector circuitry including a switching means having a plurality of leads with one of said leads providing an output signal, a second of said leads being coupled to a negative voltage to be sensed, a voltage divider circuit means being coupled to a third lead of said switching means, a second circuit means for sensing an undervoltage condition, a third circuit means for sensing unacceptable output current conditions with each one of said circuit being coupled to separate secondary windings;

fourth circuit means operable for combining the output from the first, second and third means and to generate a single output signal therefrom; and

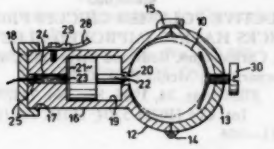
a fifth circuit means coupled to one of said secondary windings, said fifth circuit means being responsive to the output signal and operable for shorting said secondary windings whereby a surge of current exceeding the predetermined limit is made to flow through the switching transistor.

4,685,021

FAULT CURRENT DIVERTER

Juri Kortschinski, 1414 Lochlin Trail, Mississauga, Ontario, Canada (L5G 3V3); John D. Mintz, 176 Horsham Avenue, North York, Ontario, Canada (M2N 2A5), and Reinhard Filter, 14 Charles Street, Georgetown, Ontario, Canada (L7G 2Z2)

Filed Mar. 20, 1986, Ser. No. 841,452
Int. Cl.[4] H02H 7/26
U.S. Cl. 361—42 19 Claims



1. In combination with a high voltage electrical equipment including a high voltage conductor encapsulated in solid insulation, a high speed fault current diverter apparatus comprising:

a metal body having a forward end and a rearward end, said metal body providing an internal cylindrical first chamber with an opening at its forward end communicating with said first chamber and arranged coaxially therewith,

conductor means grounding said metal body,

a metallic piston mounted within said first chamber for axial movement therealong, said piston having a forwardly and axially extending spike aligned with said opening,

the metal body further providing an internal second chamber rearwardly of the first chamber and communicating therewith rearwardly of the piston,

a chemical propellant charge in said second chamber,

means for fastening the metal body to the equipment with said opening adjacent to the solid insulation of the conductor, and

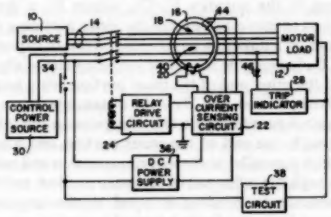
fault current responsive means igniting the chemical propellant charge so as to propel the piston forwardly, thereby causing the spike to pierce the insulation of the conductor and so establish a non-arcing low impedance current path from the conductor to ground.

4,685,022

GROUND FAULT CIRCUIT INTERRUPTER CAPABLE OF DERIVING ENERGY FROM GROUND FAULT CURRENT IN ORDER TO ACHIEVE CIRCUIT INTERRUPTION IN THE PRESENCE OF A REDUCED SUPPLY VOLTAGE

E. Lane Nichols, III, Clearwater; William P. Hooper, Largo, and Kenneth J. Leynse, St. Petersburg, all of Fla., assignors to Square D. Company, Palatine, Il.

Filed May 10, 1985, Ser. No. 733,008
Int. Cl.[4] H02H 3/16
U.S. Cl. 361—44 12 Claims



1. A ground-fault circuit interrupter interrupting the supply of electrical energy from a source to a load upon the occurrence of fault to ground, the interrupter comprising:

first sensing means for detecting an imbalance of current in electrical conductors carrying power between the source and the load;

electrical circuit means connected to the first sensing means and responsive to a signal from the first sensing means to interrupt power to the load in response to a signal from the first sensing means; and

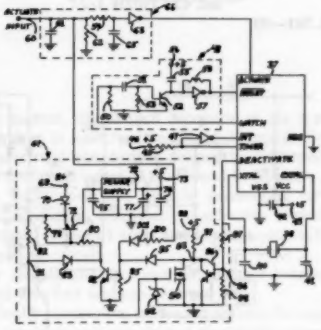
second sensing means responsive to a ground fault in the source to the load, the second sensing means capable of supplying power provided by a ground fault current to the electronic circuit to cause operation of the electronic circuit regardless of the presence of a reduced supply voltage to the electronic circuit.

4,685,023

POWER LATCH CIRCUIT FOR COMPUTER SELF DEACTIVATION

Bruce A. Heaston, West Milton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 14, 1986, Ser. No. 930,519
Int. Cl.[4] H02H 3/24
U.S. Cl. 361—88 1 Claim



1. A power latch circuit for a computer comprising, in combination:

a DC power source having first and second terminals;

a first bipolar transistor having an emitter connected to the first terminal of the DC power source, a base, a collector and a first resistor connected between the base and emitter;

voltage conditioning means connecting the collector of the first transistor to the power supply terminal of the computer;

a second bipolar transistor having a collector connected through a second resistor to the base of the first bipolar transistor, an emitter connected to the second terminal of the DC power source and a base;

a third resistor and first diode connected in series between the first terminal of the DC power source and collector of the second bipolar transistor to allow series current flow through the first diode and second bipolar transistor;

a terminal adapted to receive an actuating voltage and connected through a fourth resistor and second diode in series therewith to the base of the second transistor so as to place the second and thus the first transistors in a conductive state with the actuating voltage applied to the terminal;

a fifth resistor and third diode connected in series between the power supply terminal of the computer and the base of the second transistor in a feedback latch arrangement;

a third bipolar transistor having a collector connected to the junction of the fifth resistor and third diode, an emitter

connected to the second terminal of the DC power supply and a base adapted to receive a deactivating voltage from an output of the computer, the third bipolar transistor being effective in response to the deactivating voltage to assume a conductive state and thus, in the absence of an actuating voltage, to place the first and second transistors in a non-conducting state; and

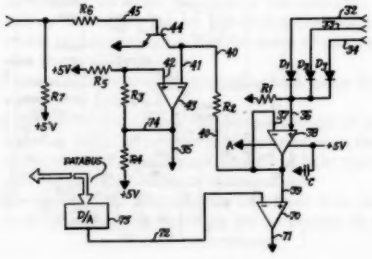
an FET having source and drain connected in parallel with the emitter-collector conduction path of the third bipolar transistor and a gate connected through the third resistor to the first terminal of the DC power source, the FET thus being placed in a conductive state by the DC power source when the second transistor is placed in a non-conducting state, whereby the FET holds the second and thus the first bipolar transistors off in spite of possible loss of the deactivating voltage as the computer powers down and further minimizes current drain in the deactivated condition.

4,685,024

OVERCURRENT CIRCUIT INTERRUPTER USING RMS SAMPLING

Paul T. Martellock, Syracuse, N.Y.; John J. Dougherty, Avon, and Nora A. Lund, Canton, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Nov. 19, 1985, Ser. No. 799,603
Int. Cl.[4] H02H *3/27*
U.S. Cl. 361—93 **3 Claims**



1. An electronic circuit interrupter comprising:

current sensing means determining RMS electric current magnitudes within a protected circuit said current sensing means comprising current transformers; said current sensing means comprising current transformers;

output control circuit means connected within said protected circuit interrupting said protected circuit upon command;

digital signal processor means connected with said current sensing means comparing said current magnitudes to stored predetermined overcurrent values and connected with said output control circuit means to interrupt said protected circuit when said current magnitudes exceed said stored predetermined overcurrent values for predetermined periods of time, said digital signal processor operating on first values of said current magnitudes up to a first level and operating on second values of said current magnitudes at a second level in excess of said first level; and a peak current sensing circuit connected with said current transformers and said output control circuit means to determine peak overcurrent values in excess of said second level, said peak current sensing means being connected to one input or an operational amplifier connected as a buffer

a first comparator input connected with an output from said buffer and with said digital signal processor comparing said buffer output with a peak reference value from said digital signal processor and outputting a trip signal when said buffer output exceeds said peak reference value;

a second comparator input connected with said buffer output comparing said buffer output to a core saturation reference value for said current transformers and outputting an interrupt signal to said digital signal processor when said buffer output exceeds said core saturation reference value; and

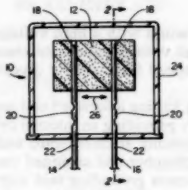
said second comparator outputting an interrupt signal to said digital signal processor when said buffer output exceeds said core saturation reference value thereby providing said digital signal processor with indication that said current transformer cores have become saturated.

4,685,025

CONDUCTIVE POLYMER CIRCUIT PROTECTION DEVICES HAVING IMPROVED ELECTRODES

William D. Carlomagno, Redwood City, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Mar. 14, 1985, Ser. No. 711,790
Int. Cl.[4] H02H *5/04;* **H01C** *10/16*
U.S. Cl. 361—106 **21 Claims**



1. A circuit protection device which comprises

(1) a PTC element composed of a conductive polymer composition which exhibits PTC behavior and which comprises a polymeric component and, dispersed in the polymeric component, a particulate conductive filler; and

(2) two electrodes which are electrically connected to the PTC element and which are connectable to a source of electrical power to cause current to pass through the PTC element and thus to cause the PTC element to self-heat to a switching temperature T_s and to expand along an axis of expension, thus generating expansion forces which are transmitted to the electrodes; at least one of said electrodes comprising

(a) a first portion which is in physical contact with the PTC element either directly, or indirectly through an element composed of a conductive polymer,

(b) a second inner portion which is not in contact with the PTC element or any other solid element, and

(c) a third outer portion which is not in contact with the PTC element;

the inner portion lying between the first portion and the outer portion, and having a first resistance to bending, parallel to the axis of expansion of the PTC element, and the outer portion having a second resistance to bending, parallel to the axis of expansion of the PTC element, the first resistance to bending being less than the second resistance to bending, where the first resistance to bending is equal to the quantity F_1/D_1, where F_1 is the force required to move one end of the inner portion a distance of 2 mils, in a direction parallel to the axis of expansion of the PTC element, the inner portion being elastically deformed and the other end of the inner portion being maintained in a fixed position, and D_1 is the distance between a first line which is parallel to the axis of expansion and which passes through one end of the inner portion and a second line which is parallel to the axis of expansion and which passes through the other end of the inner portion; and the second resistance to bending is equal to the quantity F_2/D_2, where F_2 is the force required to move one end of the outer portion a distance of 2 mils, in a direction parallel to the axis of expansion of the PTC element, the outer por-

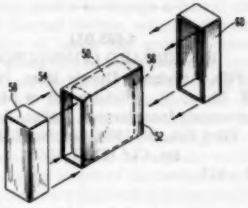
tion being elastically deformed and the other end of the outer portion being maintained in a fixed position, and D_2 is the distance between a first line which is parallel to the axis of expansion and which passes through one end of the inner portion and a second line which is parallel to the axis of expansion and which passes through the other end of the outer portion.

4,685,026

CAPACITOR FORMING AND MANUFACTURING METHOD

Bernard Lavene, Ocean, N.J., assignor to Electronic Concepts, Inc., Eatontown, N.J.

Filed Apr. 25, 1985, Ser. No. 727,030
Int. Cl.[4] H01G 1/13, 7/00
U.S. Cl. 361—308 **5 Claims**



1. A method of fabricating substantially small sized rectangular cross-section wound capacitors comprising plating a plurality of continuous regularly spaced metallic electrodes on one side of each of a pair of dielectric plastic webs, said electrodes being parallel to the web and further the electrodes being separated from each other forming a plurality of regularly spaced unplated lengthwise directed openings;

(a) arranging the plated on electrodes of the webs so that in each pair of webs at least one has a plated electrode lying along one edge and the other has an open area lying along one edge;

(b) mating said pair of webs so that the unplated side of a first of the webs is in physical contact with the plated no bracket electrode of a second web and further arranged so that the plated edge of one web lies over the unplated edge of the other web so that the remainder of the plated electrodes in each web are in a staggered and overlapping arrangement relative to each other, such that substantially the same portion of the remaining plated electrodes on one pair of webs will fall over the remaining open spaces in said webs;

(c) winding a length of said mated webs to form a layered coil to form an alternating arrangement of continuous plated electrodes spaced from layer to layer along the outer edges of said coil as it is wound;

(d) chopping the coil to provide a clear cut through the alternating open spaces and plated electrodes in the webs such that at the chopped edges for every layer there is an arrangement in which a plated electrode is at one edge and an open space at the other, alternating from one layer to the next thereby forming a plurality of capacitor elements;

(e) providing a mold for defining a rectangular capacitor element cross-section;

(f) placing at least one capacitor element in said mold;

(g) applying pressure to said capacitor element to cause it to be pressed into said mold for causing said capacitor element to be formed with said rectangular cross-section;

(h) inserting the capacitor element into a nonconductive sleeve wherein the ends of the sleeve extend substantially beyond the ends of the capacitor element forming cavities at each end of the sleeve;

(i) substantially filling the cavities with a conductive substance electrically coupled to respective turns of the electrode at each end of the capacitor element;

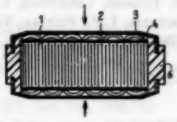
(j) positioning rectangular metal end caps at opposite ends of the sleeve and substantially enclosing the cavities and engaging and electrically coupling the end caps to the conductive substance.

4,685,027

HIGH CURRENT CAPACITOR AND METHOD FOR MANUFACTURING THE SAME

Gérard Mouries, Seurre, France, assignor to Compagnie Europeenne de Composants Electroniques LCC, Courbevoie, France

Filed Jun. 3, 1986, Ser. No. 869,878
Claims priority, application France, Jun. 6, 1985, 85 08537
Int. Cl.[4] H01G 1/13, 7/00
U.S. Cl. 361—308 **9 Claims**



1. A high current, disc-shaped capacitor of the type produced by winding at least two metallized dielectric films and comprising electrical connections defined by schooped areas provided on the lateral edges of the wound films, and a pair of substantially flat, cap-shaped electric connecting terminals which are formed of an electrically conductive material and which cover said schooped areas and connect each schooped area to an external circuit;

means for establishing an electrical contact between the schooped area and said cap-element; and

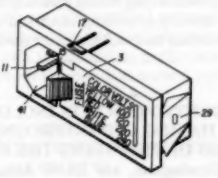
non-electrically conductive means for sealing the capacitor and for retaining said cap-shaped electrically connecting terminals in position in said capacitor.

4,685,028

A.C. POWER ENTRY MODULE

Robert A. Miller, Chicago, and David R. Marach, Sleepy Hollow, both of Ill., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Nov. 29, 1985, Ser. No. 802,807
Int. Cl.[4] H02B 1/18
U.S. Cl. 361—334 **6 Claims**



1. A power entry module for supplying power from an outside source to equipment with which said module is in association, said module comprising:

one piece housing means divided into at least two compartments, a first compartment having outside contact means housed therein for connection to an outside power source and a second compartment having first contact means in electrical connection with said outside contact means

housed in said first compartment, and second contact means in electrical connection with circuit means in said one piece housing means electrically connectable to said equipment, and said first and second contact means constructed for holding fuse means establishing electrical connection through said fuse means between said first and second contact means;

cover means hingedly connected to said one piece housing means covering said second compartment and preventing access thereto; and

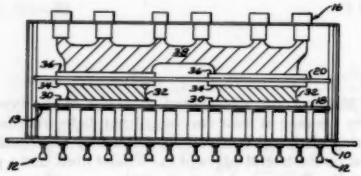
block means on said cover means preventing said cover means from being opened to permit access to said second compartment when said module is connected to an outside power source and preventing connection to an outside power source at said first compartment with said cover means hinged in an open position on said module.

4,685,029

RECONFIGURABLE STANDARD SWITCH PANEL

Christopher D. Tillman, Lakewood, Colo., assignor to Orbital Research Partners, L.P., Fairfax, Va.

Filed Mar. 14, 1986, Ser. No. 840,125
Int. Cl.[4] H02B 1/08
U.S. Cl. 361—359 **8 Claims**



1. A reconfigurable switch panel apparatus having a variety of possible configurations of switches and indicators of various types for interfacing between a human operator and a number of electrically activated or monitored devices, comprising:

a plurality of switch means;

a plurality of indicator means;

receptacle board means having sockets for electrical and mechanical connection to each of said switch means and to each of said indicator means;

wiring board means having first and second connector means connected by a plurality of electrical conductors;

first conductor means for connecting the sockets on said receptacle board means to said first connector means of said wiring board means;

third connector means for providing electrical connection to the devices;

second conductor means for connecting said second connector means of said wiring board means to said third connector means, thereby providing electrical connections from said switch means and said indicator means to the devices.

4,685,030

SURFACE MOUNTED CIRCUITS INCLUDING HYBRID CIRCUITS, HAVING CVD INTERCONNECTS, AND METHOD OF PREPARING THE CIRCUITS

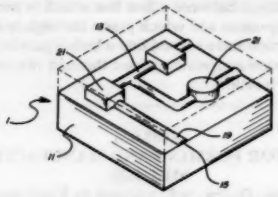
Jaime Reyes, Birmingham, and David Allred, Troy, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Apr. 29, 1985, Ser. No. 728,558
Int. Cl.[4] H05K 7/06
U.S. Cl. 361—400 **16 Claims**

16. A support adapted for use as a circuit board and comprising:

a. an insulating substrate;

b. an interfacial film thereon comprising a chemical vapor deposited metal chosen from the group consisting of a molybdenum, tungsten, manganese, and mixtures thereof; and



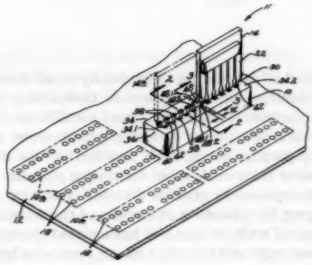
c. an interconnect layer atop the interfacial film comprising a chemical vapor deposited metal chosen from the group consisting of manganese, chromium, iron, cobalt, nickel, molybdenum, tungsten, and mixtures thereof.

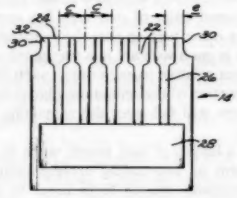
4,685,031

EDGEBOARD CONNECTOR

Robert M. Fife, Attleboro; Dennis Ross, New Bedford, and Richard F. Shaw, N. Attleboro, all of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 24, 1986, Ser. No. 831,882
Int. Cl.[4] H01R 23/70
U.S. Cl. 361—413 **2 Claims**





1. An edgeboard connector for mounting a pair of printed circuit boards each having contact pads equally spaced along a first edge of the board with equal end spacing between lateral edges of the boards and adjacent contact pads at opposite ends of said first board edges, comprising an elongated insulating housing having an elongated cavity in the housing which has a selected length between opposite ends thereof for receiving a first edge of one said of circuit boards therein within a limited portion of the cavity length at an end of cavity and for receiving a first edge of another of said circuit boards therein in another portion of the cavity length, a plurality of electrical contacts disposed in the cavity with selected center-to-center spacing therebetween for electrically engaging respective contact pads on the first edge of said one circuit board within said limited portion of the cavity while leaving other contacts in said other portion of the cavity length free of such engage-

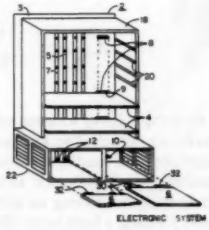
ment for electrically engaging respective contact pads on the first edge of the other of said circuit boards, the housing having portions thereof at opposite ends of the cavity with selected end spacing from contacts adjacent thereto in the cavity for engaging one lateral edge of said one circuit board inserted into the cavity, and a member detachably attachable to the housing within the cavity at a location intermediate the opposite ends of the cavity for engaging an opposite lateral edge of the one printed circuit board so that said engagements with said lateral edges of the one printed circuit board cooperate in assuring that the contact pads on the one board are electrically engaged with precisely predetermined contacts of the connector, wherein the detachable member has a selected width corresponding to the center-to-center spacing of the contacts for engaging respective lateral edges of two of the print circuit boards inserted into the cavity, wherein the detachable member has a tang thereon and the housing has a detent means within the cavity for detachably engaging the member tang to locate the detachable member in any of a plurality of selected locations in the housing cavity to engage a lateral edge of a printed circuit board inserted therein, wherein the insulating housing has a plurality of lands and grooves therein, the grooves being spaced along said housing cavity for accommodating respective contacts therein and the lands being disposed between the grooves for electrically isolating the contacts from each other, wherein the detachable member has a rib portion fitted into a groove for precisely locating the member in a predetermined position in the cavity with the width of the member extending along the length of the cavity, and wherein pairs of said spaced contacts are disposed in juxtaposed relation to each other on opposite sides of the housing cavity, the housing has a plurality of said lands and grooves juxtaposed at said opposite sides of the cavity accommodating and electrically isolating respective contacts from each other at opposite sides of the cavity to electrically engage contact pads on both sides of a printed circuit board inserted into the cavity, and the detachable member has a symmetrical cruciform cross section and has two oppositely disposed parts thereof fitted into respective juxtaposed grooves at opposite sides of the cavity for precisely locating the member in the cavity with two other parts defining the width of the member extending along the length of the cavity to permit more than one printed circuit board unit to be accommodated in the cavity in locating engagement with the detachable member.

4,685,032

INTEGRATED BACKPLANE

John W. Blomstedt, Bedford; Paul S. Yoshida, Newton Highlands; Wesley F. Irving, Braintree, and Vladimir Roudenko, Natick, all of Mass., assignors to Honeywell Information Systems Inc., Minneapolis, Minn.

Filed Jul. 1, 1985, Ser. No. 750,441
Int. Cl.[4] H05K *7/10*
U.S. Cl. 361—412 **11 Claims**



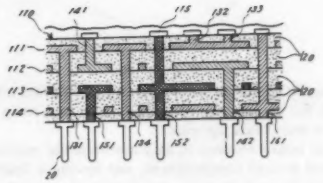
1. An electronic system having a single backplane comprises:
integrated backplane means including first connector means for transferring power and power control signals, and second connector means for transferring said power, said power control signals and logic signals, said integrated backplane means including bus bar means for distributing said power from said first connector means to said second connector means;
power supply means for providing said power and said power control signals and for receiving said power control signals, said power supply means including third connector means being pluggably coupled and said first connector means for transferring said power and said power control signals for making said system operative;
logic board means including fourth connector means pluggably coupled to said second connector means for receiving said power and for distributing said power control signals and said logic signals;
said integrated backplane means further including first circuit means for transferring said power control signals between said first and second connector means;
said integrated backplane means further including second circuit means for distributing said power from said bus bar means to said second connector means.

4,685,033

MULTILAYER WIRING SUBSTRATE

Tatsuo Inoue, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Aug. 23, 1985, Ser. No. 768,755
Claims priority, application Japan, Aug. 28, 1984, 59-177534
Int. Cl.[4] H05K *1/14*
U.S. Cl. 361—414 **9 Claims**



5. A multilayer wiring substrate, comprising:
a plurality of insulating layers;
a plurality of power supply wiring layers for supplying power voltages and being interlayered within said insulating layers to form a sandwich having first and second surfaces, said wiring layers being arranged in a first group and a second group, wherein wiring layers in said second group respectively supply voltages corresponding to voltages supplied by wiring layers in said first group;
a plurality of via-hole wirings disposed within said insulating layers and extending to at least one of the first and second surfaces, each wiring layer of the first group being connected to a wiring layer of the second group that supplies a corresponding voltage by said via-hole wirings; and
a plurality of terminals connected to each via-hole wiring that extends to one of the first and second surfaces.

4,685,034

ELECTRIC DEVICE COMPRISING INTEGRATED CIRCUITS

Sadayuki Tetsu, Yokohama, and Yasuo Tanishima, Fujisawa, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 537,016, Sep. 29, 1983, abandoned. This application Feb. 18, 1986, Ser. No. 830,485
Claims priority, application Japan, Sep. 30, 1982, 57-172163
Int. Cl.[4] H02B *1/08*
U.S. Cl. 361—424 **4 Claims**

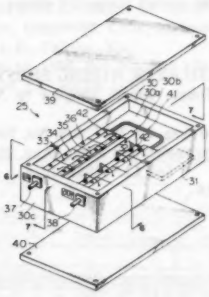
1. An electronic device comprising:
a case made of conductive material;
an intermediate partitional wall dividing the interior of the

case into first and second electromagnetically isolated compartments;

a single interrupting wall disposed perpendicularly on said intermediate partitional wall and within said first compartment;

a plurality of integrated circuit substrates including microwave integrated circuits which form a main signal circuit for processing an input signal and emitting an output signal, said integrated circuit substrates being grounded to said intermediate partitional wall in said first compartment and arrayed in two rows, each of said rows including substantially the same number of microwave integrated circuits, and being electromagnetically separated by said interrupting wall which is interposed between said rows;

means, electrically connected to said microwave integrated circuits, for electrically interconnecting said microwave integrated circuits in each of said two rows;



strip circuit means, positioned at one end of said interrupting wall, for electrically connecting said two rows of microwave integrated circuits;

a circuit board secured to said intermediate partitional wall in said second compartment, and having at least a power circuit formed thereon electrically connected to at least one of said microwave integrated circuits;

connecting elements, electrically connecting said microwave integrated circuits and said power circuit, said connecting elements extending perpendicularly through said intermediate partitional wall and arranged on either side of the interrupting wall and along side said substrates; and

a signal input terminal and a signal output terminal each electrically connected to said microwave integrated circuits, and extending through one of the side walls of said case.

4,685,035

COMPONENT MOUNTING DEVICE

Hideo Nanjoh, Okayama, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Aug. 15, 1986, Ser. No. 896,866

Claims priority, application Japan, Aug. 20, 1985, 60-127630[U]

Int. Cl.[4] H02B *1/10*

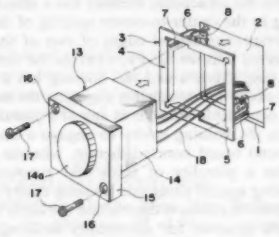
U.S. Cl. 361—429 **2 Claims**

1. A component mounting device for mounting a component to a panel member having a mounting opening defined therein, said component having a peripheral flange with at least one hole defined therein, said device comprises:

a mounting frame having a central opening defined therein for the free passage of the body of a component therethrough;

at least one carrier arm having one end integral with said mounting frame and extending therefrom in a direction substantially perpendicular to the plane of the central opening, the other end of said carrier arm being bent so as to extend inwardly of the mounting frame, said carrier arm having a passageway defined therein so as to extend generally intermediate of the width thereof in a direction axially thereof, opening inwardly from said other end of the carrier arm; and

a generally rectangular clamp member having a hole defined in one end portion thereof and supported in the passageway for movement between a folded position, in which the clamp member lies generally perpendicular to the plane of the central opening, and an operative position in



which the clamp member lies substantially parallel to the plane of the central opening, said hole being adapted to receive a set screw which would be passed through said hole in the peripheral flange whereby, when the set screw is fastened, the clamp member clamps a peripheral lip region of the panel member around the mounting opening between the mounting frame and an end of the clamp member to clamp the mounting frame to the panel member.

4,685,036

HEADLIGHT FOR ANTIDAZZLE LIGHTS OF MOTOR VEHICLES

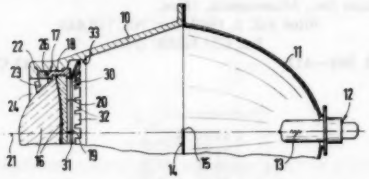
Richard Loewe, Gerlingen, and Peter Perthus, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 24, 1986, Ser. No. 822,621

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1985, 3515493

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 362—61 **25 Claims**



1. A headlight for a fog light of a motor vehicle, comprising a housing and a reflector attached to said housing to form an interior of the headlight, said headlight having an optical axis; a light source positioned in said reflector, an objective partially positioned in said interior and having an axis extending along said optical axis and forming a light beam illuminating a roadway, said reflector having a shield positioned in said interior for partially screening off light beams reflected by said reflector and having an edge forming a light-dark border line of the light beam, said objective having a lens apex positioned in the point of intersection of said optical axis and a lens surface facing said reflector, said edge of said shield being spaced from said lens apex along said optical axis by a variable distance; and

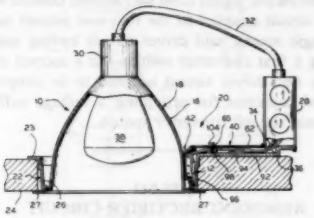
means for adjusting an axial position of said objective on said optical axis so as to adjust said variable distance.

4,685,037

SPRING LOADED RECESSED LIGHTING FIXTURE THERMAL PROTECTION

Steven R. Akiyama, Park Forest; Ronald C. Zaker, Burbank, and Curtis C. Shoup, Lindenhurst, all of Ill., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Nov. 29, 1984, Ser. No. 676,508
Int. Cl.[4] F21V *25/00*
U.S. Cl. 362—276 **20 Claims**



2. In a recessed lighting fixture adapted for mounting in a ceiling opening, said recessed lighting fixture including a lamp housing, a lamp connected to a source of electrical power and a thermal protective device connected in series with a lamp for interrupting the current to the lamp from the source of electrical power when the temperature of the outer surface of the housing exceeds a predetermined temperature, the improvement comprising:

a plaster frame having a horizontal portion and a dependent portion formed integrally with the horizontal portion, said frame being adapted for mounting in the ceiling opening;

the lamp housing being adapted for mounting within the dependent portion of said frame; and

adjustable retaining means for holding the thermal protective device in intimate heat transfer contact with a variety of lamp housing outer surface designs;

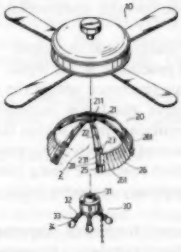
whereby the temperature of the outer surface of the housing is sensed.

4,685,038

FOLDABLE LAMPSHADE FOR A HANGING LAMP

Ming C. Huang, No. 788, Chung-San Rd., Seh-Ko Tsun, Sen-Kang Hsian, Taichung Hsien, Taiwan

Filed Dec. 17, 1985, Ser. No. 810,059
Int. Cl.[4] F21V *1/06*
U.S. Cl. 362—352 **4 Claims**



1. A foldable lampshade comprising:

a center piece having a plurality of curved ribs extending radially and downwardly from said center piece, each of said curved ribs having a bottom free end;

a plurality of lower rib segments each having an upper free end to be connected to a respective one of the bottom free ends of said curved ribs and a lower free end having an upwardly turned crook portion to define a holding groove;

pivot studs each with two end heads penetrating and connecting the upper free ends of said lower rib segments and the bottom free ends said curved ribs;

tension spring members on said pivot studs between said upper free ends and said bottom free ends for biasing said upper and bottom ends against the end heads of said studs so as to rigidly hold said lower rib segments to said curved ribs; and

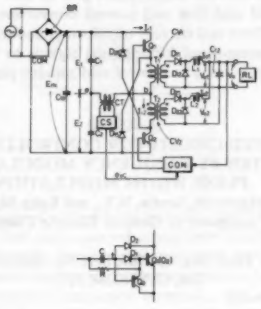
shade segments oriented annularly around said lower rib segments, each shade segment having two lateral sides fitted snugly in the holding grooves of said lower rib segments.

4,685,039

DC/DC CONVERTER

Kiyoharu Inou, and Hitoshi Saito, both of Tokyo, Japan, assignors to Yokogawa Hokushin Electric Corporation, Tokyo, Japan

Continuation of Ser. No. 667,267, Nov. 1, 1984, abandoned. This application Jun. 4, 1986, Ser. No. 873,091
Claims priority, application Japan, Nov. 15, 1983, 83-214509; Nov. 15, 1983, 83-214511; Nov. 15, 1983, 83-214512
Int. Cl.[4] H02M *3/335*
U.S. Cl. 363—16 **10 Claims**



1. A DC/DC converter comprising

an AC voltage supply means comprising an AC voltage source, a bridge rectifying circuit for rectifying said AC supply voltage and a smoothing capacitor connected across said bridge rectifying circuit;

a first converter and a second converter, each comprising

a transformer comprising a primary coil and a secondary coil,

a switching element connected in series with said primary coil, and

a capacitor connected in parallel with said primary coil and said switching element and also connected to said bridge rectifying circuit, for generating DC voltages;

a first diode connected between one terminal of said primary coil of said transformer of said first converter and a minus terminal of DC input voltage, thereby to form a closed circuit together with said transformer of said first converter and said capacitor of

said converter when said switching element of said first converter is turned OFF;

a second diode connected between one terminal of said primary coil of said transformer of said converter and a plus terminal of DC input voltage, thereby to form a

closed circuit together with said transformer of said second converter and said capacitor of said first converter when said switching element of said second converter is turned OFF;

output circuit means for rectifying and smoothing signals generated at respective said secondary coils of said transformers of said first and second converters, thereby to generate DC output voltages, wherein said output circuit means comprises a smoothing capacitor having a pair of terminals, one of said terminals being connected to one side of each of said secondary windings, a first output circuit, and a second output circuit, said first and second output circuits being separate from each other, each of said first and second output circuits comprising a third diode and a fourth diode, each having a negative terminal connected to a terminal of a respective secondary winding and a positive terminal connected to each other to form a node, and a choke coil connected between said node connecting said third and fourth diodes and the other terminal of said smoothing capacitor, such that said DC output voltages are produced at the pair of terminals of said smoothing capacitor with desired current allocation by said first and second converters;

a current transformer connected between a node of a series circuit comprising said first and second converters, and a node of said capacitors of said first and second converters for detecting therethrough total current at the primary side so that said switching elements are driven with suitable phase difference; and

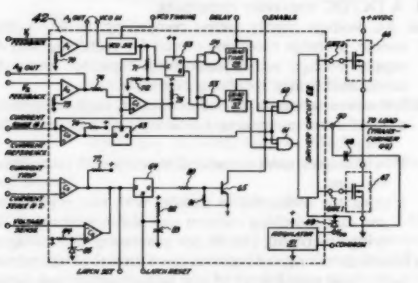
control means connected to said other terminal of said smoothing capacitor of said output circuit means, said switching element of each of said first and second converters, said current transformer, and to said switching elements of said first and second converters for receiving signals from said current transformer and from said output circuit means and for applying signals to said switching elements thereby to control said suitable phase difference.

4,685,040

INTEGRATED CIRCUIT FOR CONTROLLING POWER CONVERTER BY FREQUENCY MODULATION AND PULSE WIDTH MODULATION

Robert L. Steigerwald, Scotia, N.Y., and Keku M. Mistry, Shalimar, Fla., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 6, 1985, Ser. No. 805,651
Int. Cl.[4] H02M *3/337*
U.S. Cl. 363—17 **10 Claims**



1. An integrated circuit for driving the converter switches of and controlling at least one output voltage of a DC to DC converter, said integrated circuit comprising:

a first control loop including a first amplifier, a voltage-controlled oscillator, and connection means for permitting the output of said first amplifier to be coupled with the input of said voltage-controlled oscillator, the output of said voltage-controlled oscillator comprising the output of said first control loop;

a second control loop including a second amplifier coupled to a first comparator, said first comparator also being coupled to the output of said voltage-controlled oscillator, the output of said comparator comprising the output of said second control loop;

logic means connected to the output of each of said first and second control loops, respectively, for generating a pair of switching signals at first and second outputs thereof, respectively, each of said switching signals having a frequency in accordance with the output signal from said first control loop and having a duty ratio in accordance with the output signal from said second control loop; and

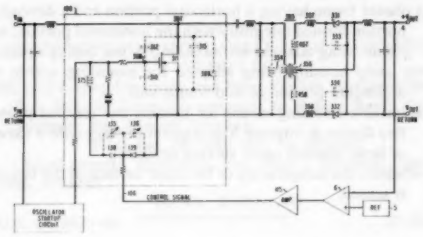
a driver circuit coupled to the first and second outputs of said logic means, said driver circuit having outputs for driving a first converter switch and a second converter switch, said driver circuit adapted to be coupled to an external capacitor for providing a voltage sufficient to drive said second converter switch.

4,685,041

RESONANT RECTIFIER CIRCUIT

Wayne C. Bowman, Rockaway; Frank M. Magalhaes, Three Bridges; Weyman B. Sulter, Jr., Whippany, and Norman G. Ziesse, Chester, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 710,506, Mar. 11, 1985, Pat. No. 4,605,999. This application Aug. 8, 1986, Ser. No. 894,978
Int. Cl.[4] H02M *7/42, 1/12*
U.S. Cl. 363—40 **20 Claims**



11. A power rectifying circuit for a power converter circuit having an inverter circuit generating a substantially sinusoidal signal and an energy transfer between the inverter and the rectifying circuit being substantially at a single frequency lying within a defined regulatory frequency range, comprising:

an input for accepting a substantially sinusoidal signal,

an output for supplying a load,

a rectifying diode located intermediate to the input and output,

a first inductive reactance at the input,

a first capacitive reactance at the input,

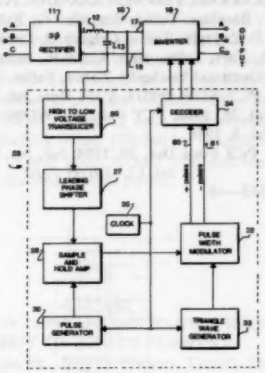
a second inductive reactance within the rectifying circuit, a second capacitive reactance including adjunct capacitance of the rectifying diode within the rectifying circuit, the first and second inductive reactance and the first and second capacitive reactance being tuned to establish first and second frequency response poles in an impedance of the input,

the first and second frequency response poles selected to bracket the defined regulatory frequency range whereby a resistive component of impedance at the input is substantially invariant to frequency change within the defined regulatory frequency range.

4,685,042
MODULATOR CONTROL FOR INVERTER

Alexander J. Severinsky, Dallas, Tex., assignor to Unitron, Inc., Garland, Tex.

Filed Jul. 3, 1984, Ser. No. 627,721
Int. Cl.[4] H02M 1/12
U.S. Cl. 363—41 2 Claims



1. A modulator control for an inverter having a rectified DC signal applied to its input, the modulator control comprising:

a high to low voltage transducer for producing a low voltage signal representation of said DC signal;

a leading phase shifter for shifting the phase of the said low voltage signal;

a sample and hold amplifier to which the said phase-shifted signal is applied;

a pulse generator for generating timing pulses applied to the sample and hold amplifier, whereby the sample and hold amplifier produces an output signal having an amplitude corresponding to the amplitude of the said phase-shifted signal during periods indicated by the pulse generator output;

a triangle wave generator for generating a triangle wave output signal;

a pulse width modulator for receiving the triangle wave output signal and the output signal from the sample and hold amplifier to produce output pulses indicative of the level of the said DC signal; and

a decoder for receiving and decoding the output pulses from the pulse width modulator, the decoded pulses from the decoder being applied to the inverter to produce a three phase output therefrom having reduced amplitude modulation.

4,685,043
INVERTER FOR GENERATING A STAIRCASE-SHAPED A.C. VOLTAGE ON EACH OF THE PHASE CONDUCTORS OF A MULTIPHASE SYSTEM

Walter Mehnert, Ottobrunn, Fed. Rep. of Germany, assignor to MITEC Moderne Industrietechnik GmbH, Ottobrunn, Fed. Rep. of Germany

Filed Apr. 17, 1985, Ser. No. 724,213
Claims priority, application Fed. Rep. of Germany, Apr. 21, 1984, 3415145
Int. Cl.[4] H02M 1/12, 7/44
U.S. Cl. 363—43 17 Claims

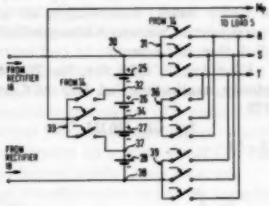
1. Inverter for generating, on each of the phase conductors of a multiphase system, a staircase-shaped voltage approximating an a.c. voltage which sinusoidally and periodically increases from a zero voltage to a positive crest voltage, decreases therefrom through said zero voltage to a negative crest voltage and increases again therefrom to said zero voltage, the staircase-shaped voltages on the different phase conductors having a phase shift with respect to each other the value of which is equal to 360° electr. divided by the number of phase conductors in said multiphase system, wherein said inverter comprises

a d.c. power supply having

an even number of d.c. voltage source units which are connected in series with same polarities and

several output terminals being connected to said d.c. voltage source units so that there is one center point output terminal and one positive and one negative end output terminal which are electrically symmetrical to said center point output terminal, whereby the voltage between the one end output terminal and the center point output terminal has the same value but the opposite sign as the voltage between the other end output terminal and the center point output terminal, the voltage values of the d.c. voltage source units being chosen so that at said output terminals of said d.c. power supply at least the following d.c. voltages are available: one positive and one negative crest voltage the value of which corresponds to the crest voltage of the a.c. voltage to be approximated, one positive and one negative first intermediate voltage, having the same absolute value which is above zero and below the absolute value of the crest voltage, and one positive and one negative second intermediate voltage having the same absolute value which is above the absolute value of said first intermediate voltage and below the absolute value of the crest voltage,

said inverter further comprising



at least three groups of controllable switches each of which switches has a first and a second connection terminal and is switchable to an fro between a closed status, in which it establishes an electrically conducting connection between said first and second connection terminals, and an open status, in which it interrupts the electrically conducting connection between said first and second connection terminals, each of said at least three groups of switches comprising a number of switches which is equal to the number of phase conductors in said multiphase system, each of said first connection terminals of the switches of each group being connected to a respective one of said phase conductors, the second connection terminal of the switches of a first one of said at least three groups being commonly connected to said positive end output terminal, the second connection terminals of the switches of a second one of said at least three groups being commonly connected to said centre point output terminal, and the second connection terminals of the switches of a third one of said at least three groups being commonly connected to said negative end output terminal, and

a control means by which said switches are controllable so that, for the staircase-shaped approximation of each voltage half wave of the sinusoidal a.c. voltage, each of said phase conductors is connectable.

for a first time span t_1 to an output terminal of said d.c. power supply providing said zero voltage,

for a second time span t_2 following immediately thereon to an output terminal of said d.c. power supply providing the

one of said two first intermediate voltages having the same sign as the voltage half wave to be approximated,

for a third time span t_3 following immediately thereon to an output terminal of said d.c. power supply providing the one of said two second intermediate voltages having the same sign as the voltage half wave to be approximated,

for a fourth time span t_4 following immediately thereon to an output terminal of said d.c. power supply providing the one of said two crest voltages having the same sign as the voltage half wave to be approximated,

for a fifth time span t_5 following immediately thereon to an output terminal of said d.c. power supply providing the same second intermediate voltage as used during said third time span t_3,

for a sixth time span t_6 following immediately thereon to an output terminal of said d.c. power supply providing the same first intermediate voltage as used during said second time span t_2, and

for a seventh time span t_7 following immediately thereon to an output terminal of said d.c. power supply providing said zero voltage,

this sequence being repeated with alternating voltage sign at double the frequency of the multiphase voltage to be approximated.

4,685,044

METHOD AND APPARATUS FOR SUPPRESSING RESONANCE PHENOMENA IN THE A-C NETWORK ON THE INVERTER SIDE OF A HIGH VOLTAGE D-C TRANSMISSION SYSTEM

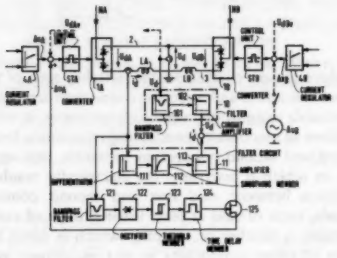
Manfred Weibelzahl, Uttenreuth; Georg Wild, Langensendelbach, and Kadry Sadek, Lauchringen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 7, 1985, Ser. No. 763,466

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1984, 3431979

Int. Cl.[4] H02H *7/00*

U.S. Cl. 363—51 **13 Claims**



10. An apparatus for suppressing resonance phenomena in the a-c voltage on the inverter side of a high voltage d-c transmission system, said system including a regulator for supplying a control voltage (Δx_A), a first converter addressed by the control voltage and connected to a first a-c voltage network, said first converter impressing on a subsequent converter choke a d-c current (i_d) determined by the regulator; said apparatus including a measuring stage subordinated to the converter choke for forming a voltage (U_d) of the high voltage d-c transmission system for determining a pilot control quantity (ΔU_A) which can be added to said control voltage; said high voltage d-c transmission system comprising a pair of lines connected to the inputs on the d-c voltage side of a second converter feeding into a second a-c voltage network, said apparatus further comprising means for filtering the measured value of the high voltage d-c transmission system voltage (U_d) which is tuned to the frequency of a resonance oscillation due to the resonance phenomenon of the second a-c voltage network and which forms the oscillation component of the voltage measurement value corresponding to this resonance frequency, while rotating the phase and amplification of the amplitude, thereby forming said pilot quantity (ΔU_A).

4,685,045

DEVICE FOR FAILURE DETECTION IN SERIES-CONNECTED SEMICONDUCTOR RECTIFIERS

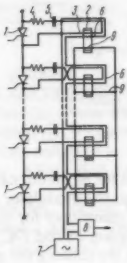
Viktor P. Baraban, Tallin; Stanislav G. Zabrovsky, Moscow; Albert F. Zvyagin, Tallin; Grigory B. Lazarev, Moscow, and Yaak A. Tars, Tallin, all of U.S.S.R., assignors to P/O Tallinsky Electrotekhnichesky Zavod, Tallin, U.S.S.R.

PCT No. PCT/SU84/00073, § 371 Date Jul. 25, 1986, § 102(e) Date Jul. 25, 1986, PCT Pub. No. WO86/03897, PCT Pub. Date Jul. 3, 1986

PCT Filed Dec. 20, 1984, Ser. No. 900,154

Int. Cl.[4] H02H *7/10*

U.S. Cl. 363—68 **1 Claim**



1. A device for failure detection in series-connected semiconductor rectifiers, comprising a pulse generator, RC-circuits whose number is equal to that of said rectifiers and which are connected by resistors to anodes of each rectifier, and transformers whose number is equal to that of the rectifiers, the input winding of each transformer being connected by one lead thereof to a cathode of a respective rectifier, while the series-connected supply windings of said transformers are connected by one terminal to a first output of the pulse generator, characterized in that the transformers (**2**) are provided with additional parallel-connected windings (**9**), and second leads of each input winding (**3**) of the transformers (**2**) are connected to capacitors (**5**) of respective RC-circuits, a measuring element (**8**) being connected to a second lead of the pulse generator (**7**) and to a second terminal of the circuit composed of the series-connected supply windings (**6**) of the transformers (**2**).

4,685,046

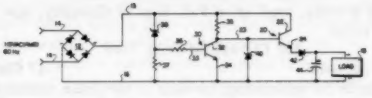
LOW VOLTAGE DIRECT CURRENT POWER SUPPLY

Gary G. Sanders, Lakewood, Ohio, assignor to The Scott & Fetzer Company, Cleveland, Ohio

Filed Oct. 3, 1985, Ser. No. 783,878

Int. Cl.[4] H02M *7/04*; G05F *5/00*

U.S. Cl. 363—89 **8 Claims**



1. A transformerless, low voltage, direct current, regulated power supply of the switching type, for energizing a low power requirement direct current load comprising:

means for providing direct current voltage pulses at a fixed frequency, each pulse having a gradually increasing lead-

ing edge and a gradually decreasing trailing edge, the peak voltage of said pulses exceeding the voltage requirements of said load; and

electronic means electrically connectable to said pulse providing means and said load, said electronic means continuously applying to the load only a leading edge portion and a trailing edge portion of each of said pulses, the peak voltage of said applied portions being less than the said peak voltage of said pulses so as not to exceed the voltage requirements of said direct current load, said electronic means including regulating means (40, 60) for clamping the peak level of said edge portions at a predetermined upper level to increase the amount of power provided to said load by said edge portions without said peak level of said edge portions exceeding said predetermined upper level, and switching means (38, 50) for causing said electronic means to only apply to said load said leading and trailing edge portions of said pulses.

4,685,047

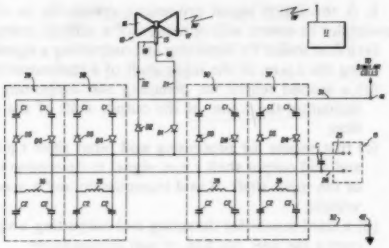
APPARATUS FOR CONVERTING RADIO FREQUENCY ENERGY TO DIRECT CURRENT

Raymond P. Phillips, Sr., 1200 S. Frances, Terrell, Tex. 75160

Filed Jul. 16, 1986, Ser. No. 886,138

Int. Cl.[4] H02M 7/06

U.S. Cl. 363—126 **11 Claims**



1. Apparatus for converting radio frequency energy into direct current for generating electric power, the apparatus comprising:

a dipolar input for receiving radio frequency energy;

a positive output line connected to one pole of the dipolar input and a negative output line connected to the other pole of the dipolar input;

a positive transmitting input diode means in the positive output line and a negative transmitting input diode means in the negative output line;

first and second bus lines and a pair of tuned circuits of opposite polarity coupling the positive output line and negative output line to the bus lines, one of the bus lines being connected to ground;

each tuned circuit including a first bridging line connecting the positive output line to the first and second bus lines and a second bridging line connecting the negative output line to the first and second bus lines, each bridging line having a bridging diode means therein oriented at a polarity which is reverse with respect to the transmitting input diode means of the respective output line; the bridging lines of each tuned circuit being connected to one another by an inductance and having capacitors disposed between the bridging diode means thereon and the bus lines, and

a direct current device connected to the bridging lines of the tuned circuit.

4,685,048

AC-DC TRANSFORMATION CIRCUIT

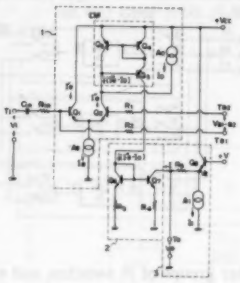
Satoru Tazaki, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Mar. 12, 1986, Ser. No. 838,999

Claims priority, application Japan, Mar. 29, 1985, 60-65573

Int. Cl.[4] H02M 7/217

U.S. Cl. 363—127 **9 Claims**



1. An FM tuner comprising transformation circuit means for facilitating multipath detection, said transformation circuit means including:

voltage-current transformation means for transforming an AC input voltage which includes multipath noise into a transformed current having a magnitude which corresponds to the amplitude of said input voltage;

first current mirror circuit means for transforming said transformed current into an output current, said first current mirror circuit means including first and second transistors and including first and second emitter resistances which are each coupled to the emitter of a respective one of said first and second transistors, said output current having a magnitude dependent on a ratio of said first emitter resistance to said second emitter resistance; and

current-voltage transformation means for transforming said output current into an output voltage having a magnitude dependent on the magnitude of said output current;

wherein said voltage-current transformation means includes: third and fourth transistors coupled to form a differential amplifier, the input AC voltage being applied to a base of said third transistor; means for maintaining a constant potential difference between the bases of said third and fourth transistors so that the potential at a base of said fourth transistor is lower than that at the base of said third transistor; second current mirror circuit means connected to a collector of said fourth transistor of said differential amplifier; and a constant current source coupled to said fourth transistor; and

wherein said current-voltage transformation means includes an emitter follower circuit coupled to said first current mirror circuit means.

4,685,049

UNRESTRICTED FREQUENCY CHANGER SWITCH TOPOLOGY

Charles L. Neft, Murrysville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 22, 1986, Ser. No. 888,666

Int. Cl.[4] H02M 5/22

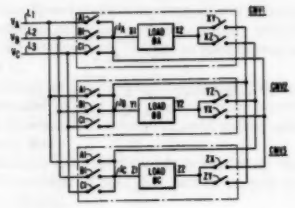
U.S. Cl. 363—159 **7 Claims**

1. In a UFC bridge system including a plurality of bilateral power switches operated in a repetitive switching pattern at a selected repetition rate to apply successive increments of alternating voltage from a N-phase voltage source to supply N output loads with current at an output frequency which is a

function of the difference between the input frequency and said repetition rate, the combination of:

N groups of N of said switches, each of said N groups being associated with one end of a corresponding one of said N output loads and with the respective N phases of said voltage source;

N groups of (N−1) additional said switches, each of said (N−1) additional switches being connected to a corresponding said one end for an output load belonging to the



(N−1) other groups of N switches, and each of said N groups of (N−1) additional switches being associated with the other end of a corresponding one of said N output loads;

whereby said output loads form through said (N−1) additional switches a polygonal assembly of said output loads, and said polygonal assembly is connected selectively to the respective phases of said voltage source by selective control of said N groups of N switches.

4,685,050

METHOD OF TIGHTENING THREADED FASTENERS

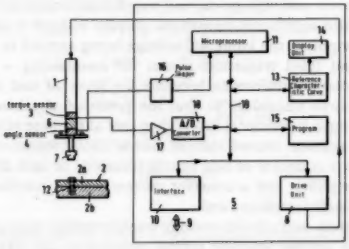
Bernhard Polzer, Riesbürg, and Johann Roemischer, Lauchheim, both of Fed. Rep. of Germany, assignors to Deutsche Gardner-Denver GmbH, Westhausen, Fed. Rep. of Germany

Filed Jun. 11, 1985, Ser. No. 743,562

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1984, 3422522

Int. Cl.⁴ G05B *13/02*; G05D *17/02*

U.S. Cl. 364—152 **11 Claims**



8. A method of tightening threaded fasteners with a controlled fastener driving tool wherein said tightening is controlled by the elastic limit, the method comprising the steps of:

continuously determining the slope of a characteristic curve corresponding to a stress-strain characteristic as an actual value;

comparing said actual value with a predetermined slope determined in preliminary tests for a characteristic fastener driving case;

generating a control signal for terminating the fastener driving operation upon reaching said predetermined slope;

storing the slopes of characteristic curves of several characteristic fastener cases as reference characteristic curves over their entire respective courses;

assigning the slope determined in the straight portion of the actual-value characteristic curve by comparing those of said stored reference characteristic curves whose linear slope (A_1) comes closest to the slope (A_0) of the acutal-value characteristic curve; and,

evaluating the switch-off slope (A_2) of these reference characteristic curves as a switch-off criteria.

4,685,051

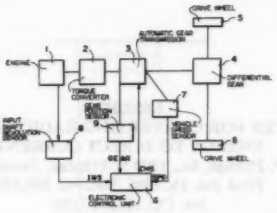
REVOLUTION SIGNAL PROCESSING SYSTEM FOR VEHICULAR ELECTRONIC CONTROLLER

Toshihiro Hattori, Ayase; Katsuya Shishido, Fujisawa; Hitoshi Kasai, Kawasaki; Shigeki Moride, Yokosuka, and Noriaki Ogawa, Tokyo, all of Japan, assignors to Isuzu Motors Limited, Tokyo and Fujitsu Limited, Kawasaki, both of, Japan

Filed Dec. 26, 1984, Ser. No. 686,523

Int. Cl.⁴ B60K *41/08*

U.S. Cl. 364—424.1 **5 Claims**



1. A revolution signal processing system for an electronic controller to ensure safe operation of a vehicle, comprising:

(a) a first sensor for detecting and outputting a signal indicating the r.p.m. of the input shaft of a transmission;

(b) a second sensor for detecting and outputting a signal indicating the r.p.m. of the output shaft of the transmission;

(c) first means for processing said input shaft r.p.m. signal and said output shaft r.p.m. signal to determine the r.p.m. of the input shaft of said transmission and a speed of the vehicle;

(d) a third sensor for detecting and outputting a signal indicating the gear position of said transmission;

(e) second means, responsive to the gear position signal, for detecting the gear position of said transmission;

(f) third means for judging that said first sensor is malfunctioning when the r.p.m. of said input shaft exhibits a value lower than a first predetermined value and the speed of the vehicle exhibits a value equal to or higher than a second predetermined value, when the gear position of said transmission detected by said second means is other than in a neutral position; and

(g) fourth means for judging that said second sensor is malfunctioning when the speed of said vehicle exhibits a value lower than the second predetermined value and the r.p.m. of said input shaft exhibits a value equal to or higher than the first predetermined value, when the gear position of said transmission detected by said second means is other than in a neutral position.

4,685,052

PULSE TRAIN PRESENCE DETECTOR

Walter J. Sanders, Jeannette, Pa., assignor to American Standard Inc., Wilmerding, Pa.

Filed Feb. 19, 1985, Ser. No. 702,530

Int. Cl.⁴ G06F *11/30*

U.S. Cl. 364—426 **12 Claims**

1. A pulse train presence detector for a microprocessor-controlled vehicle braking system having interruptible safety components, said pulse train presence detector comprising:

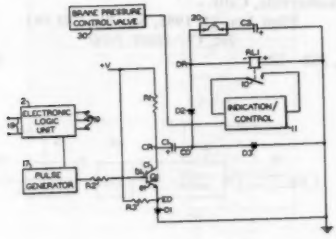
(a) a pulse generator coupled to the microprocessor and

receptive of an operating signal generated by the microprocessor upon substantially continuous microprocessor operation, said pulse generator outputting a pulse train of a predetermined frequency in response to such operating signal;

(b) a transistor member having a base electrode coupled to said pulse generator such that, such pulse train, when in a high state, turns said transistor "on" , and, when such pulse train is in a low state, turns said transistor "off";

(c) a first current path connected to a collector electrode of said transistor, wherein a first current flows therethrough when said transistor is turned "off", said first current path including a first resistor and a forward-biased first diode;

(d) a second current path connected to said first current path wherein a second current flows when said transistor is turned "on", said second current path including a reverse-biascd second diode coupled adjacent said forward-biased first diode such that, said first current flowing in said first current path is prevented from flowing in said second current path and said second current flowing in said second current path is prevented from flowing in said first current path when said transistor is in said "off" state;



(e) first storing means in said first current path for storing a current change at a predetermined first voltage, said first voltage being achieved following said first current flowing in said first current path for a predetermined first time period;

(f) a relay member in said second current path and having a coil portion which is energized by said second current flowing in said second current path such that at least one set of relay contacts are operated thereby in conjunction with the interruptible safety components to detect the presence of said pulse train, said coil having a resistive value associated therewith; and

(g) second storing means in said second current path for storing a current change at a predetermined second voltage, said second voltage being achieved following said second current flowing in said second current path for a predetermined second time period, said second current flowing as a function of said resistive value of said coil and said first voltage stored in said first storing means and introduced to said second current path when said transistor is turned "off", said second current continuing to flow in said second current path and said second current being a function of said second voltage and said resistive value of said coil when said transistor is turned "on".

4,685,053

PROGRAMMABLE CONTROLLER WITH FAULT DETECTION

Kiyoshi Hattori, Shiroyama, and Eiji Usuda, Fussa, both of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

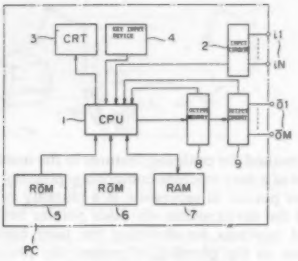
PCT No. PCT/JP84/00576, § 371 Date Jul. 30, 1985, § 102(e) Date Jul. 30, 1985, PCT Pub. No. WO85/02694, PCT Pub. Date Jun. 20, 1985

PCT Filed Dec. 5, 1984, Ser. No. 767,271

Claims priority, application Japan, Dec. 6, 1983, 58-229153

Int. Cl.[4] G06F *9/00, 11/00*

U.S. Cl. 364—184 **2 Claims**



1. A programmable controller connectable to an external unit, comprising:

a central processing unit for providing a first signal;

an output memory, coupled to said central processing unit, for storing the first signal from said central processing unit and for providing, as an output, a second signal, the second signal also being fed back to said central processing unit;

an output circuit, coupled to said central processing unit and said output memory, and connectable to the external unit, for receiving the second signal from said output memory and for providing, as an output to the external unit, a third signal, said output circuit including means for feeding back the third signal to said central processing unit, said output circuit and said output memory being susceptible to damage and abnormal operation when said output circuit is connected to the external unit, said central processing unit including:

means for comparing the first and third signals, for comparing the first and second signals and for generating a first abnormality signal indicative of an abnormality in said output circuit if the first and third signals do not coincide and for generating a second abnormality signal indicative of an abnormality in said output memory if the first and second signals do not coincide; and

a display device, coupled to said central processing unit, for providing a display identifying an abnormality in one of said output circuit and said output memory when the corresponding one of the first and second abnormality signals is generated.

4,685,054

METHOD AND APPARATUS FOR OUTLINING THE ENVIRONMENT OF A MULTIARTICULAR DUTY MACHINE BY MEANS OF A LASER POINTER

Markku Manninen, Haukipudas, and Aarne Halme, Oulu, both of Finland, assignors to Valtion Teknillinen Tutkimuskeskus, Finland

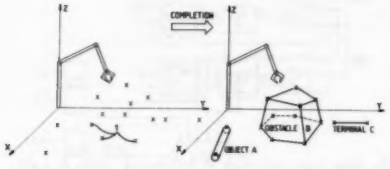
PCT No. PCT/FI84/00050, § 371 Date Feb. 28, 1985, § 102(e) Date Feb. 28, 1985, PCT Pub. No. WO85/00316, PCT Pub. Date Jan. 31, 1985

PCT Filed Jun. 29, 1984, Ser. No. 711,501

Claims priority, application Finland, Jun. 30, 1983, 832399

Int. Cl.[4] G06F *15/46*

U.S. Cl. 364—191 **12 Claims**



1. A method for outlining features in the manipulation environment of a duty machine comprising: pointing the laser beam of a laser pointer in succession at a plurality of points on features of the environment, the laser pointer being movable to different positions for directing the laser beam at different directions to the plurality of points, the plurality of points being at different distances from the laser pointer; measuring the direction of the laser beam for each point; measuring the distance of the laser pointer to each point; storing the measured directions and distances for each point in a memory, the stored directions and distances forming position information for each of the points; selecting one of a plurality of geometric plane figures representing primitive volumes, using a keyboard; providing a plurality of mathematical algorithms which are useful in producing model spatial planes and curves using some of the plurality of points; and applying the geometric plane figures and the mathematical algorithms to the position information of the plurality of points to form a model of the manipulation environment including its features.

4,685,055

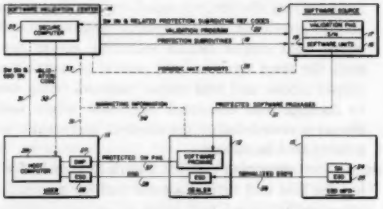
METHOD AND SYSTEM FOR CONTROLLING USE OF PROTECTED SOFTWARE

Richard B. Thomas, 1902 E. Hope St., Mesa, Ariz. 85203

Filed Jul. 1, 1985, Ser. No. 750,287

Int. Cl.[4] G06F *9/00*

U.S. Cl. 364—200 **1 Claim**



1. A central control system for protecting computer software, comprising:

(A) a protected software package, including

(1) a software unit having an ascertainable serial number,

(2) a protection subroutine having a unique reference code, including

(a) means for establishing communication with an ESD,

(b) means for generating ESD interrogation signals, and

(c) means for causing completion of execution of said protected software by a host computer in communication with said ESD only if said protection subroutine recognizes an identifier signal generated by said ESD, and

(3) a validation program which communicates a validation code to said ESD;

(B) an ESD having an ascertainable identification number electronically connected to said software package, including means for generating identifier signals in response to said interrogation signals;

(C) a secure computer having a working memory electronically connected to said host computer containing

(1) said software serial number and the corresponding unique reference code, and

(2) means for generating said validation code in response to inputs of said software serial number and said ESD identifier; and

(D) communication means electronically interconnecting said secure computer, said ESD and said protected software package for transmiting said validation code to said protected software package.

4,685,056

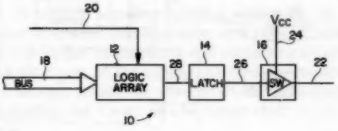
COMPUTER SECURITY DEVICE

William J. Barnsdale, Jr., West Sacramento, and Frank G. Ford, Sacramento, both of Calif., assignors to Pueblo Technologies, Inc., Kelseyville, Calif.

Filed Jun. 11, 1985, Ser. No. 743,592

Int. Cl.[4] G06F *1/00*

U.S. Cl. 364—200 **18 Claims**



1. In a digital computer system having a central processing unit (CPU), at least one memory device that includes several contiguous memory locations individually definable by discrete addresses, and at least one bus forming at least part of a path for the parallel transmission of information between the CPU and memory device, a security device for preventing unauthorized access to preselected memory locations within the memory device, comprising:

logic device means external to said CPU and said memory device for recognizing a group of signals present on said bus associated with accessing at least one memory location which has been predefined as a memory location which will not intentionally be accessed during the execution of authorized programs by the CPU, and generating in response thereto a first signal;

latch means for generating and maintaining a second signal whenever the first signal has been received from said logic device means; and

switching device means, connected to the memory device, for preventing further access to at least the preselected memory locations within the memory device when the second signal is received from said latch means.

4,685,057

MEMORY MAPPING SYSTEM

Lou Lemone, Stow; Salvatore Faletra, Framingham; John R. McDaniel, Acton, and Steve Caldara, Wayland, all of Mass., assignors to Data General Corporation, Westboro, Mass.

Filed Jun. 6, 1983, Ser. No. 501,205

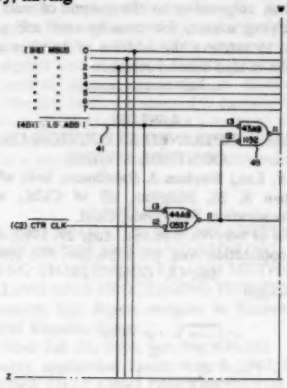
Int. Cl.[4] G06F *13/00*

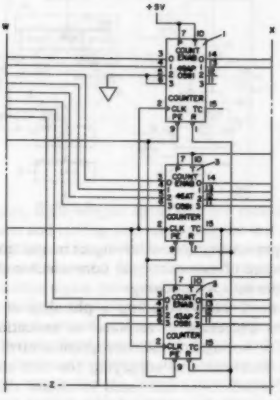
U.S. Cl. 364—200 **6 Claims**

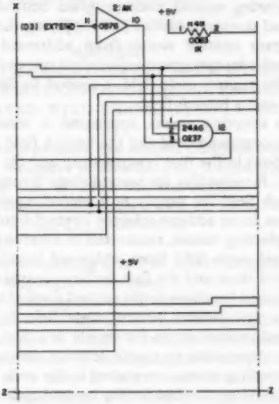
1. A system for transferring a block of information into a first memory, said system comprising:

(i) a second memory;

(ii) a host computer, operatively connected to said first memory, having

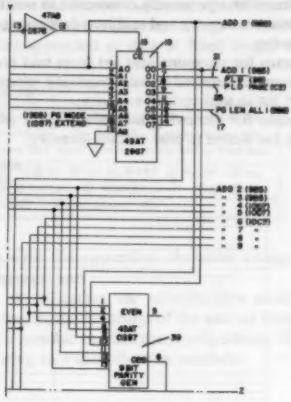


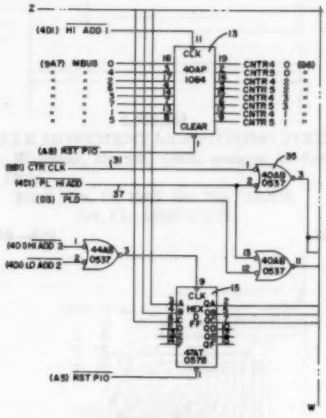


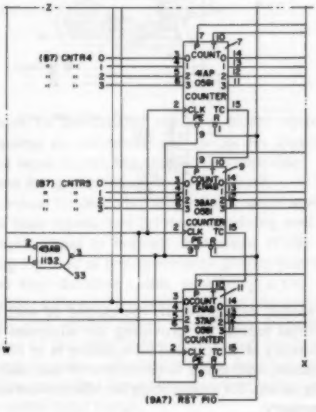


(a) means, operatively connected to said first memory, for identifying regions of said first memory which are available for storing at least part of said block of information,

(b) means, connected to said identifying means, for selecting, from said regios identified by said identifying







means, a set of regions to receive said block of information, and

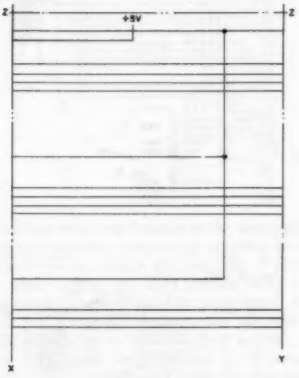
(c) means, connected to said selecting means, for creating a list of the initial address of each region in said set of regions;

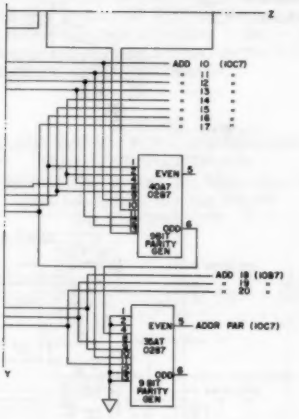
(iii) a controller, operatively connected to said first memory, said second memory and said host computer, said controller having

(a) means for receiving said list from said host computer;

(b) means, connected to said receiving means, for storing said list in said second memory;

(c) means for retrieving individual initial addresses from said list stored in said second memory;





(d) means, responsive to the output of said address retrieval means, for providing the addresses in said first memory at which said information is to be stored;

(e) means, responsive to the output of said address providing means, for transferring the information into said first memory;

(f) means, connected to said means for providing the addresses and operative during the transferring of the information into said first memory, for identifying when the region of said first memory into which the information is being stored is full; and

(g) means, responsive to the output of said full region identifying means, for causing said address retrieval means to retrieve the address of another region from said list in said second memory.

4,685,058

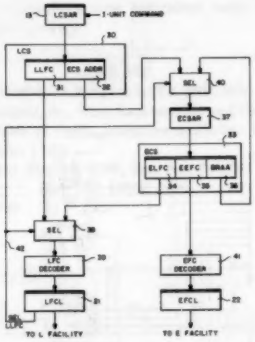
TWO-STAGE PIPELINED EXECUTION UNIT AND CONTROL STORES

Hsiao-Peng S. Lee,; Stephen J. Rawlinson, both of Sunnyvale, and Stephen S. Si, Milpitas, all of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 528,161, Aug. 29, 1983, abandoned. This application Aug. 15, 1986, Ser. No. 898,741

Int. Cl.[4] **G06F** *9/28*

U.S. Cl. 364—200 **5 Claims**



1. A data processing system having an instruction unit generating a sequence of execution unit commands and a means for supplying operands, comprising:

a first control store including a plurality of first storage locations addressed in response to execution unit commands for storing first microprogram control words in the storage locations and supplying the first microprogram control words from addressed locations, the first microprogram control words including a first facility control code field and a second stage command field;

a second control store including a plurality of second storage locations addressed in response to second stage addresses, for storing second microprogram control words in the second storage locations and supplying the second microprogram control words from addressed locations, the second microprogrammed control words including a first facility control code field, a second facility control code field and a branch field;

address selecting means, connected to receive the second stage command field and the branch field from addressed locations in the first control store and the second control store, for selecting the second stage command field or the branch field for supply as a second stage address in response to an address selector control signal;

code selecting means, connected to receive the first facility control code field from addressed locations in the first control store and the first facility control code field from addressed locations in the second control store, for selecting a first facility control code field from the first or second control stores for supply as a first facility control code in response to a code selector control signal;

first decoding means, connected to the code selector means, for decoding the first facility control code to generate first control signals and the address and code selector control signals;

second decoding means, connected to the second control

store, for decoding the second facility control code field to generate second control signals; and

execution means, connected to receive the operands, for executing the first and second control signals, the execution means including a first facility responsive to the first control signals and a second facility responsive to the second control signals connected in pipeline fashion whereby the first facility is adapted to execute first control signals for a given execution unit command in the same cycle that the second facility executes second control signals for a preceding execution unit command.

4,685,059

METHOD AND APPARATUS FOR MEASURING BODY FLUID CONSTITUENTS AND STORING AND MANAGING THE TEST DATA AND METHOD OF CONTROLLING AND PROCESSING THE TEST DATA

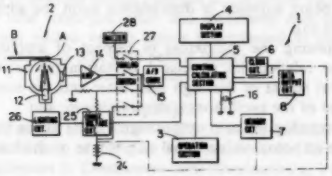
Hiroshi Yamamoto, Uji, Japan, assignor to Kabushiki Kaisha Kyoto Daiichi Kagaku, Japan

Filed Jul. 31, 1984, Ser. No. 636,302

Claims priority, application Japan, Aug. 5, 1983, 58-144245

Int. Cl.[4] G06F *15/42*; G06G *7/60*; G01N *30/96, 21/00*

U.S. Cl. 364—415 **4 Claims**



1. A small-size, light-weight apparatus for measuring body fluid constituents and storing and managing the test data, comprising an analyzing section which optically measures a body fluid sample by use of a solid reagent, a microcomputer which receives the electric signal generated in the analyzing section, determines the timing of measurement, calculates the measured value from the amount of said received electric signal with reference to the standard amount of signal and calibration curve stored in the microcomputer, an operating section which gives operation instruction to the microcomputer from the outside, a display section which displays the results of measurement together with the instruction of operating procedure and operation redoing, a clock circuit, and a memory circuit which stores the results of measurement and the output of the clock circuit when the measurement is performed.

4,685,060

METHOD OF TRANSLATION BETWEEN LANGUAGES WITH INFORMATION OF ORIGINAL LANGUAGE INCORPORATED WITH TRANSLATED LANGUAGE TEXT

Fumiyuki Yamano, Kawasaki, and Atsushi Okajima, Yokohama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 19, 1984, Ser. No. 662,850

Claims priority, application Japan, Oct. 21, 1983, 58-195989

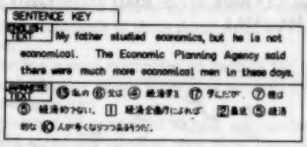
Int. Cl.[4] G06F *15/38*

U.S. Cl. 364—419 **3 Claims**

1. A method of translating a text of a first language into a text of a second language, comprising:

a first step of providing individual identification numbers to words/idioms which appear in the text of said first language to identify the words/idioms, in accordance with a predetermined order by managing saidi words/idioms as data sorted in a table in which said words/idioms are arranged in accordance with said predetermined order with the same identification number being provided to the same word/idiom;

a second step of generating the text of said second language including said identification numbers as well as character strings of said second language corresponding to said words/idioms of said first language in which the identification numbers for the words/idioms of said first language corresponding to the character strings of said second language are appended as data of fixed length in correspondence with the respective character strings of said second language; and


SENTENCE KEY
My father studied economics, but he is not economical. The Economic Planning Agency said there were much more economical men in these days.

a third step of indicating the identification numbers appended to the character strings of the second language, so as to make it possible to trace the words/idioms of the first language using said identification numbers.

4,685,061

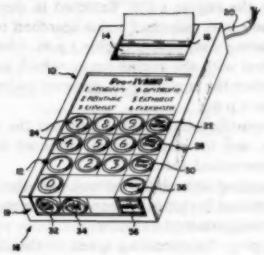
VEHICLE MOVEMENT MONITORING SYSTEM

Charles D. Whitaker, Dayton, Ohio, assignor to Ketek Inc., Dayton, Ohio

Filed Mar. 12, 1985, Ser. No. 710,823

Int. Cl.[4] G06F *15/74*

U.S. Cl. 364—424 **22 Claims**



1. Apparatus for monitoring use of a motor vehicle, said vehicle including an odometer and means for generating a vehicle speed input signal, the apparatus comprising:

clock means for generating a real-time signal;

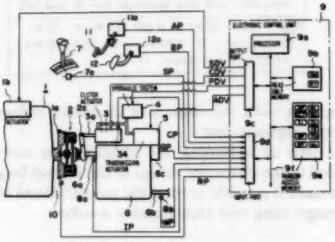
processor means for receiving said vehicle speed input signal and said time signal, and (a) upon receiving said vehicle speed input signal to indicate movement of the vehicle following a period of non-movement greater than a predetermined stop duration value, generating a trip starting time, and (b) following generation of said trip starting time and until said vehicle speed input signal indicates non-movement of the vehicle for at least said predetermined stop duration value, calculating a trip duration value and a trip distance value based on said time signal and said vehicle speed input signal;

storage means connected to said processor means for receiving and storing said trip starting time, said trip duration value and said trip distance value.

4,685,062
START CONTROL METHOD FOR AUTOMATIC CLUTCH

Makoto Uriuhara, Yokohama, and Atsushi Ohmori, Tokyo, both of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

Filed Dec. 26, 1984, Ser. No. 686,522
Claims priority, application Japan, Dec. 30, 1983, 58-245852
Int. Cl.[4] B60K *41/22;* F16D *27/16;* G05D *17/02*
U.S. Cl. 364—424.1 2 Claims



1. A method of controlling an automatic clutch when starting to move a vehicle having an engine and an automatic transmission with an input shaft, comprising the steps of:

(a) detecting the extent of clutch engagement, the r.p.m. of the engine, and the r.p.m. of the input shaft of said vehicle;

(b) searching for an engine r.p.m. reference value corresponding to the extent of clutch engagement detected in step (a) from a prescribed map data;

(c) comparing the r.p.m. of the engine detected in step (a) with the engine r.p.m. reference value searched in step (b);

(d) dropping the operating speed of a clutch actuator to zero to interrupt the application of the clutch, when the engine r.p.m. detected in step (a) is smaller than the engine r.p.m. reference value searched in step (b);

(e) determining the operating speed of the clutch actuator, when the engine r.p.m. detected in step (a) exceeds the engine r.p.m. reference value searched in step (b);

(f) replacing a maximum engine r.p.m. which has ever been reached with the engine r.p.m. which is detected in step (a), when the engine r.p.m. detected exceeds the maximum engine r.p.m.;

(g) comparing the difference between the maximum engine r.p.m. and the engine r.p.m. detected in step (a) with a predetermined value;

(h) operating the clutch actuator at the operating speed determined in step (e), when the difference is smaller than the predetermined value; and

(i) dropping the operating speed of the clutch actuator to zero to interrupt the application of the clutch, when said difference is greater than said predetermined value.

4,685,063
PROCESS AND DEVICE FOR COMPENSATION OF THE EFFECT OF ROLL ECCENTRICITIES

Georg Weihrich, Uttenreuth, and Dietrich Wohld, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

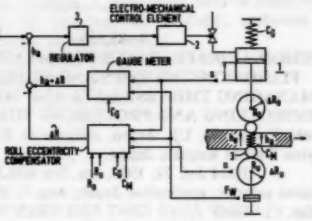
Filed Jul. 5, 1985, Ser. No. 752,407
Claims priority, application Fed. Rep. of Germany, Jul. 5, 1984, 3424693
Int. Cl.[4] G06F *15/46;* B21B *37/12*
U.S. Cl. 364—472 7 Claims

1. A process for compensation of the effect of roll eccentricities in position or thickness regulation of a roll stand, comprising steps of:

(a) forming a sum signal from a measured value of a roll force (F_W) multiplied by the sum of the inverse values of a stand spring constant (C_G) and a material spring constant (C_M), and a measured value of a roll adjustment position (s);

(b) sending the sum signal through a high pass filter (HF) a frequency of which is adjusted in dependence upon a speed (n) of a support roll of the roll stand;

(c) comparing an output signal of the high pass filter with a sum output signal of at least one pair of oscillators, said oscillators being provided for simulation of roll eccentricity oscillations, and frequencies of said oscillators being



preset in dependence upon the radius of the support roll and being adjusted in dependence upon the support roll speed (n);

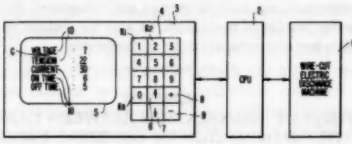
(d) adjusting the oscillators in respect of amplitude and phase relationship so that a deviation (e) between the output signal of the high pass filter and the sum output signal of the oscillators is at a minimum; and

(e) subtracting the sum output signal (ΔR) of the oscillators from an actual value signal of position or thickness.

4,685,064
ELECTRIC DISCHARGE MACHINING CONDITION SETTING SYSTEM

Mitsuo Kinoshita, Hachiouji, and Haruki Obara, Sagamihara, both of Japan, assignors to Fanuc Ltd, Japan

PCT No. PCT/JP83/00339, § 371 Date May 25, 1984, § 102(e) Date May 25, 1984, PCT Pub. No. WO84/01734, PCT Pub. Date May 10, 1984
PCT Filed Oct. 12, 1983, Ser. No. 618,397
Claims priority, application Japan, Oct. 25, 1982, 57-185975
Int. Cl.[4] G05B *19/405;* B23Q *15/00*
U.S. Cl. 364—474 2 Claims



1. A wire cut electric discharge machining condition setting system comprising:

a display unit;

cursor shift push button switch means for shifting a cursor on the display unit and for selecting, via said cursor, a machining condition to be changed;

numerical push button switch means for receiving manual inputs and for changing the selected machining condition in accordance with said manual inputs;

increment and decrement push button switch means including an increment button and a decrement button, for updating a preset value of said selected machining condition, including

means for determining whether or not the increment button is depressed and for determining whether or not the decrement button is depressed;

means for increasing the preset value by a predetermined

amount in accordance with the increment button being depressed;

means for decreasing the preset value by a predetermined amount in accordance with the decrement button being depressed;

means for changing the rate at which said selected machining condition is changed in accordance with a depression time of said increment and decrement push button switch means and such that the preset value is changed so that neither hunting nor undesirable cutting of the wire electrode occurs when the preset value is updated during machining, including

means for detecting the time that said increment and decrement push button switch means is depressed;

means for determining if the detected time falls in a first time period of a second time period larger than the first time period; and

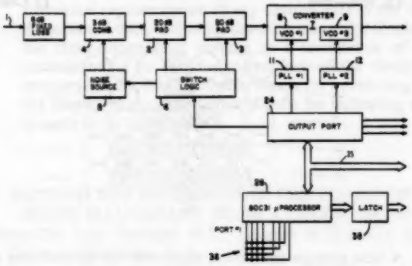
renewal means for selectively operating said increment and decrement push button switch means for a first time interval when the detected time falls within the first time period, for operating said increment and decrement push button switch means for a second interval when the detected time falls within the second time period and for operating said increment and decrement push button switch means during a first time period so as to prevent abrupt changes in the preset value during a time from just after said increment and decrement push button switch means is depressed to the time at which said first time period begins.

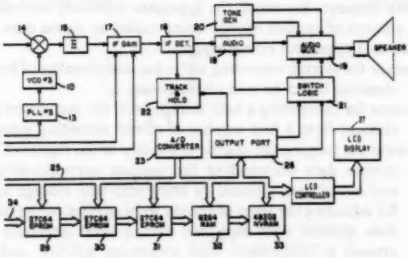
4,685,065

PORTABLE SAMPLING SPECTRUM ANALYZER

Warren L. Braun, and Walter M. Curt, both of Harrisonburg, Va., assignors to ComSonics, Inc., Harrisonburg, Va.

Filed May 23, 1985, Ser. No. 737,217
Int. Cl.[4] G01R *23/06, 31/28;* G06F *15/36*
U.S. Cl. 364—485 **22 Claims**





1. A portable sampling spectrum analyzer for making field measurements in a multichannel configured coaxial cable communication system, comprising:

a microprocessor;

memory means connected to said microprocessor for storing control code and data;

switch means connected to said microprocessor for providing operator input signals to said microprocessor;

signal selecting means connectable to a coaxial cable and controlled by said microprocessor for sampling in time a plurality of predetermined frequency channels of a coaxial cable communication system by selectively tuning a plurality of said channels at times determined by said microprocessor;

signal detection means connected to receive the output of said signal selecting means for storing sampled data in said memory means; and

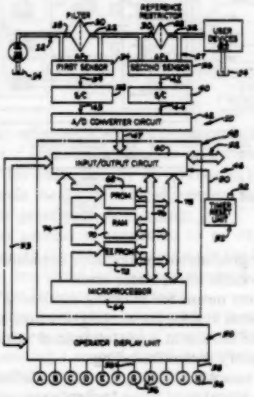
visual display means connected to said microprocessor for displaying measured sampled data in at least one mode that displays data for all said predetermined frequency channels simultaneously.

4,685,066

CONTAMINATION MONITOR AND METHOD

Joseph C. Hafele, Peoria, and John W. Crayton, Washington, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Dec. 18, 1984, Ser. No. 683,106
Int. Cl.[4] G01N *11/04*
U.S. Cl. 364—509 **17 Claims**



1. A contamination monitor for continuously sensing particle contamination in a liquid system having a filter, comprising:

sensor means for producing a first electrical signal related to the pressure differential across the filter;

a reference restrictor in downstream communication with the filter;

reference sensor means for producing a second electrical signal related to the pressure differential across the restrictor; and

processing means including a programmable data processor and memory unit for receiving the first and second electrical signals and providing a recognizable compensated output corresponding to the contamination level of the liquid system.

14. A method of monitoring the contamination level of a liquid system having a filter, comprising:

(a) producing an electrical signal related to the pressure differential across the filter and directing it to a programmable data processor and interface unit;

(b) providing reference means downstream of the filter for delivering a reference electrical signal to the data processor and interface unit indicative of variations in at least one of the viscosity of the liquid and the flow passing through the filter; and

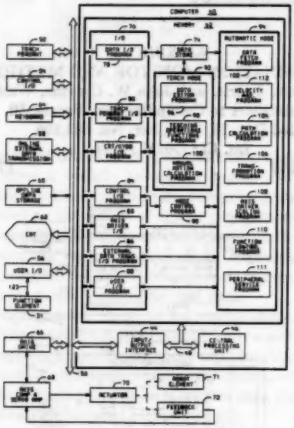
(c) manipulating such electrical signal information in the data processor and interface unit and directing a plurality of command signals to an operator display unit indicating certain normal and abnormal operating conditions of the filter and the liquid system.

4,685,067

CONTROL SYSTEM FOR PROGRAM CONTROLLED MANIPULATOR HAVING MULTIPLE TRIGGERED FUNCTIONS BETWEEN PROGRAMMED POINTS

Daniel B. French, Florence, Ky.; Richard E. Brookshire, and Joseph W. Schnelle, both of Cincinnati, Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Feb. 20, 1986, Ser. No. 832,271
Int. Cl.[4] G06F *15/46*; G05B *19/42*
U.S. Cl. 364—513 **25 Claims**



1. A programmable manipulator apparatus comprising:
a. a moveable manipulator arm;
b. actuator means for effecting motion of the arm; and
c. a control system for moving the arm along a prescribed path of motion at a predetermined velocity including
i. memory means including
(a) means for storing informatio defining the location of a plurality of spaced points along said path of motion, and
(b) programming means for storing information associated with a designated one of said points defining a predetermined distance interval;
ii. and means for producing a plurality of triggers as said arm is moved by said actuator means along said path of motion between said designated point and one of said points adjacent to said designated point, the distance between adjacent ones of said triggers corresponding to said distance interval.

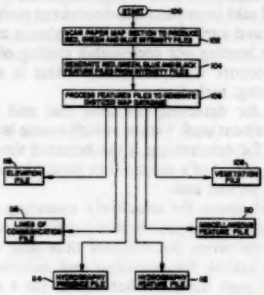
4,685,068

GENERIC DATABASE GENERATOR SYSTEM AND METHOD

Joseph A. Greco, II, Silver Spring, Donald K. Hawkins, College Park, Scott R. LeGrys, Burtonsville, and Wai Kit Man, Silver Spring, all of Md., assignors to The Singer Company, Silver Spring, Md.

Filed Aug. 20, 1985, Ser. No. 767,733
Int. Cl.[4] G06F *15/66*; H04N *1/46*; G06K *9/46*
U.S. Cl. 364—518 **30 Claims**

1. A method for generating a digitized map database comprising the steps of:
(a) scanning a map source to obtain digitized raw data in matrix format;
(b) producing interim data from said raw data;
(c) processing said interim data to identify and extract at least two selected features; and



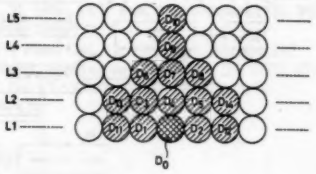
(d) obtaining said selected features to produce the digitized map database having a high resolution in matrix format, comprising a separate file for each selected feature.

4,685,069

HEAT STORAGE CORRECTION APPARATUS

Toshiharu Inui; Haruhiko Moriguchi; Masayuki Hisatake, and Takashi Ohmori, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Dec. 21, 1984, Ser. No. 684,787
Claims priority, application Japan, Dec. 23, 1983, 58-242113
Int. Cl.[4] G01D *15/10*
U.S. Cl. 364—506 **12 Claims**



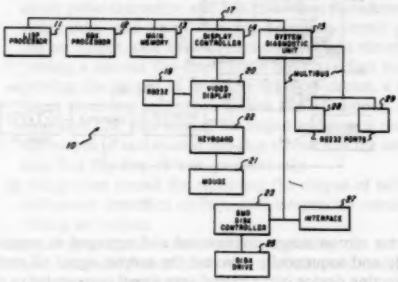
1. A heat storage correction apparatus for determining the amount of energy to be applied to a plurality of heater elements in a thermal head for recording picture data, the one of said heater elements for which the apparatus currently determines the amount of applied energy being called an aimed data element, said apparatus comprising:
means for storing recording states for said plurality of heater elements based on said picture data;
means for calculating a heat storage level for said aimed data element from a first number of stored recording states;
means for judging the degree of solidity in the region of said picture data surrounding the portion corresponding to said aimed data element by using said heat storage level, for adjusting the level of energy to be applied to the aimed data element such that said energy level generally decreases in accordance with increasing solidity, and for increasing said energy level when said surrounding region is judged to be substantially solid; and
means for setting the amount of energy for said aimed data element from said aimed data element energy level and the recording state for said aimed data element.

4,685,070

SYSTEM AND METHOD FOR DISPLAYING, AND INTERACTIVELY EXCAVATING AND EXAMINING A THREE DIMENSIONAL VOLUME

Bruce E. Flinchbaugh, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 3, 1984, Ser. No. 637,465
Int. Cl.[4] G06F *15/62, 15/68*
U.S. Cl. 364—522 11 Claims



4. A computer system for displaying and for interactively excavating and examining a three-dimensional volume, comprising:

(a) a source of three-dimensional arrays of data including a data memory means storing a three-dimensional array of numbers;

(b) designator means for selectively designating all or any desired part of the three dimensional data to be presented, including a designator memory means storing a three-dimensional array of bits, each bit designating a single one of the numbers; and

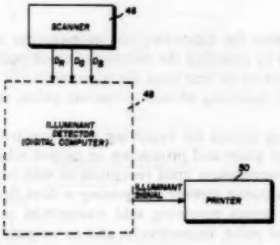
(c) interactive, visual display means, responsive to the designator means, for presenting in two-dimensions a three-dimensional representation of any desired part of the three-dimensional data, including drawing means for displaying the three-dimensional volume as a tessellation of cells corresponding to the designated bits of the designator memory means, and electronic means for interacting with the display of the tessellation of cells for indicating a cell or cells to be excavated.

4,685,071

METHOD FOR DETERMINING THE COLOR OF A SCENE ILLUMINANT FROM A COLOR IMAGE

Hsien-Che Lee, Penfield, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 18, 1985, Ser. No. 712,498
Int. Cl.[4] G01J *1/00*
U.S. Cl. 364—526 13 Claims



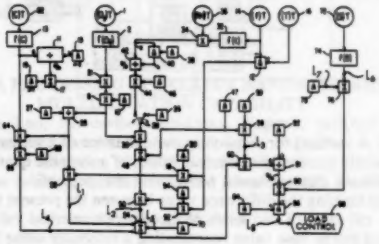
1. A method for determining the color of a scene illuminant from a color photographic image, of a scene containing a plurality of differently colored specularly reflecting surfaces, comprising the steps of: scanning the color photographic image to produce a digital color image; transforming the digital color image to a chromaticity space; and processing the transformed digital color image to detect the color of specularly reflected light in the scene, the color of the specularly reflected light corresponding to the color of the scene illuminant.

4,685,072

STEAM GENERATOR ON-LINE EFFICIENCY MONITOR

Ralph K. Johnson, Highland Heights; Azmi Kaya, Akron; Marlon A. Keyes, IV, Chagrin Falls, all of Ohio, and William H. Moss, Kingwood, Tex., assignors to The Babcock & Wilcox Company, New Orleans, La.

Continuation-in-part of Ser. No. 329,538, Dec. 10, 1981, abandoned. This application Jan. 2, 1985, Ser. No. 688,213
Int. Cl.[4] G06F *15/46, 15/36;* F23N *5/18*
U.S. Cl. 364—551 7 Claims



1. A system for automatically and continuously determining the efficiency of a combustion process in a fossil-fuel fired vapor generator for utilization by an automatic load control system that controls the distribution of a system load among a plurality of vapor generators, comprising:

a first function generator, connected to an oxygen transducer for sensing the level of excess air in the flue gas, for generating a first signal indicative of the total air supplied for combustion in percent by weight;

a second function generator, connected to a combustibles transducer for sensing the level of combustibles in the flue gas, for generating a second signal indicative of the percent combustibles present in the flue gas;

means for correcting the first signal, connected to said first and second function generators, when the oxygen transducer is of a type that operates at a temperature level sufficient to cause the unburned combustibles to react with the oxygen present in the flue gas;

an ambient air temperature transducer for generating a third signal indicatve of the temperature of the ambient air supplied to the vapor generator for combustion;

a flue gas exit temperature transducer for generating a fourth signal indicative of the temperature of the flue gas exiting from the vapor generator;

means for generating a fifth signal indicative of the temperature difference between the flue gas exiting from the vapor generator and the ambient air supplied to the vapor generator;

means for generating a sixth signal indicative of the specific heat of the dry flue gas;

means for generating a ninth signal, indicative of the pounds of dry exit flue gas per pound of fuel, from said first and second signals, a seventh signal indicative of the required theoretical air for combustion, and an eighth signal indicative of the weight of combustibles in a pound of fuel; and

means for generating a tenth signal, indicative of the heat loss in dry flue gas, from the product of said fifth, and sixth and ninth signals.

4,685,073

INTELLIGENT DISPLAY SYSTEM FOR INDICATING SUCCESSIVELY OCCURING NUMERICAL VALUES

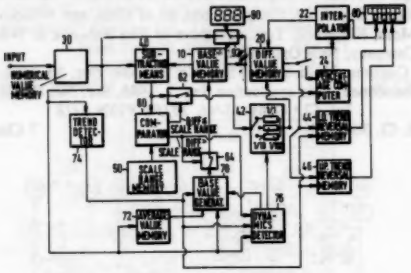
Norbert Acker, Falltorweg 5, 6072 Dreieich, Fed. Rep. of Germany

Filed Mar. 27, 1985, Ser. No. 716,750

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1984, 3412297

Int. Cl.[4] G06G 7/48

U.S. Cl. 364—551 14 Claims



1. A method for displaying the dynamics of a series of successively occurring numerical values of a variable quantity on an analog display means, comprising the steps of:

(a) forming the difference value between the present numerical value of said series of successive numerical values and a stored base value representing a reference value for said successively occurring numerical values;

(b) comparing the difference value with an analog display range of said analog display means for determining whether the difference value formed falls within said analog display range or not;

(c) if the difference value falls within said analog display range:

(c1) displaying said difference value as analog value on said analog display range;

(d) if the difference value does not fall within said analog display range on said analog display means:

(d1) determining a new base value as a function of the present numerical value so that a new difference value formed between the present numerical value and the new base value falls within said analog display range,

(d2) storing the new base value in replacement of the formerly stored base value,

(d3) displaying said new difference value as analog value on said analog diplay range;

(e) repeating the above steps upon occurrence of the next numerical value which then forms the new present value.

4,685,074

FILM AREA COMPUTER

Joe T. May, Leesburg, and Steven D. Hale, Lovettsville, both of Va., assignors to Electronic Instrumentation and Technology, Sterling, Va.

Filed Nov. 13, 1984, Ser. No. 670,647

Int. Cl.[4] G01B 11/28; G06G 15/46

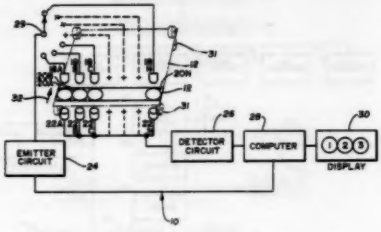
U.S. Cl. 364—564 33 Claims

1. An instrument for measuring an area on a film which is clear or transparent to electromagnetic radiation which has a characteristic wavelength the film having areas which are either clear or transparent or closed or opaque to the radiation, the instrument comprising:

source means projecting radiation having the characteristic wavelength across a segment of a width of the film;

a plurality of detecting devices responsive to the characteristic wavelength of the radiation and arranged adjacent to each other in a linear array in optical coordination with the source means, each detecting device detecting the amount of radiation transmitted through an incremental area of the film and producing an output signal representative thereof;

transport means for introducing relative movement of a constant velocity to the film relative to both the source means and the detecting devices;



detector circuit means constructed and arranged to repeatedly and sequentially convert the output signal of each detecting device into a digital area signal representative of an amount of clear area within the respective incremental area of film; and

control means connected to receive the area signals and constructed and arranged for computing the total clear area on the film and providing a signal representative thereof.

4,685,075

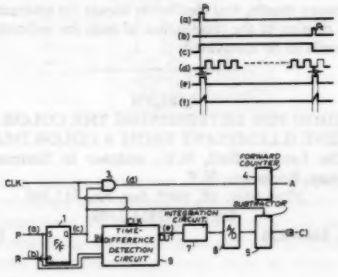
APPARATUS FOR MEASURING PROPAGATION TIME OF ULTRASONIC WAVES

Yukiji Morita, and Masafumi Yoshida, both of Tokyo, Japan, assignors to Kaijo Denki Co., Ltd., Japan

Filed May 3, 1984, Ser. No. 606,540

Int. Cl.[4] G01R 29/02; G04F 10/00

U.S. Cl. 364—569 5 Claims



1. Apparatus for measuring the propagation time of ultrasonic waves by counting the number of clock pulses occurring within the period of time from the transmission of an ultrasonic pulse to the receiving of said ultrasonic pulse, said apparatus comprising

a receiving circuit for receiving a transmitted pulse and a received pulse and producing an output which continues from transmission until reception of said received pulse, said receiving circuit comprising a first flip-flop circuit having inputs receiving said transmitted pulse and said received pulse, respectively, and an output;

a gate circuit for providing an output and receiving the output of said receiving circuit, and for receiving clock pulses;

a forward counter for receiving the output of said gate

circuit, said counter counting the number A of clock pulses in the output of said gate circuit;

a time-difference detection circuit for receiving the output of said receiving circuit and said clock pulses and for detecting pulses occurring during a time interval t_1+t_0 and a time interval t_2+t_0, where t_1 is a time interval starting at the leading edge of said transmitted pulse and ending at the leading edge of the first clock pulse thereafter, t_2 is a time interval starting at the leading edge of said received pulse and ending at the leading edge of the first clock pulse thereafter, and t_0 is an arbitrary predetermined delay time, said time-difference detection circuit providing an output, said time difference detection circuit comprising a second flip-flop circuit having a first input receiving the output of said first flip-flop circiut, a second input receiving said clock pulses and an output, and an exclusive OR gate having an output and inputs receiving the output of said second flip-flop circuit and the output of said first flip-flop circuit, respectively;

an integration circuit for receiving the output of said time-difference detection circuit, said integration circuit providing an output;

an analogue-digital converter for digitizing the output of said time-difference detection circuit, said integration circuit providing an output;

an analog-digital converter for digitizing the output of said integration circuit at amplification ratios which are m times said time interval t_1+t_0 and said time interval t_2+t_0, said analog-digital converter providing an output; and

a subtractor for receiving the output of said analog-digital converter and the output of said receiving circuit which continues from transmission to reception, and calculating the difference between a digital numeric value B corresponding to the time interval $m(t_1+t_0)$ detected numeric value C corresponding to the time interval $m(t_2+t_0)$, the duration of the time interval t between transmission and reception being determined in accordance with the equation,

$$t=[A+1/m(B-C)]\times(\text{time corresponding to one clock wavelength}).$$

4,685,076

VECTOR PROCESSOR FOR PROCESSING ONE VECTOR INSTRUCTION WITH A PLURALITY OF VECTOR PROCESSING UNITS

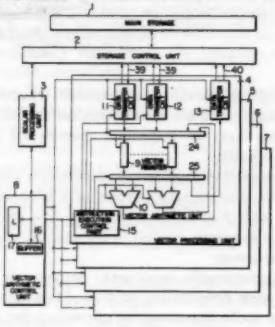
Yaoko Yoshida, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 3, 1984, Ser. No. 657,354

Claims priority, application Japan, Oct. 5, 1983, 58-185007

Int. Cl.[4] G06F *15/347*

U.S. Cl. 364—736 **5 Claims**



1. A vector processing system comprising:

main storage means for storing vector instructions and vector data;

a plurality of vector processing units connected to said main storage means for processing different vector elements, each of the vector processing units including:

(1) a plurality of vector registers;

(2) at least one vector arithmetic unit, selectively connected to receive vector data from a vector register, for processing said received vector data and for sending the result of processing to a vector register; and

(3) at least one data transfer circuit for transferring data between said main storage means and said vector registers;

first holding means for holding the number of all the vector elements to be processed;

second holding means provided for each vector processing unit for holding the number of vector elements to be processed in each processing unit; and

means for determining the numbers to be set in the second holding means on the basis of the number set in the first holding means.

4,685,077

DATA PROCESSING APPARATUS HAVING BINARY MULTIPLICATION CAPABILITY

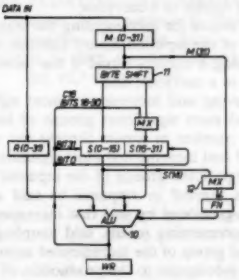
Johnson Loo, Newcastle-under-Lyme, England, assignor to International Computers Limited, London, England

Filed Jan. 17, 1985, Ser. No. 692,348

Claims priority, application United Kingdom, Jan. 24, 1984, 8401808

Int. Cl.[4] G06F *7/52*

U.S. Cl. 364—759 **6 Claims**



1. Data processing apparatus comprising

(a) an arithmetic and logic unit (ALU) having first and second inputs,

(b) an operand register comprising first and second portions both connected to the first input of the ALU, the first portion being operable as a shift register independently of the operation of the second portion,

(c) means for applying a multiplicand to the second input of the ALU,

(d) means for loading a multiplier into the first portion of the operand register,

(e) means for reading successive bits of the multiplier from said first portion,

(f) control means responsive to each multiplier bit read from said first portion, for operating the ALU to produce a partial result equal to the sum of its first and second inputs in the event that the multiplier bit is equal to one, and otherwise equal to the first input, and

(g) means for shifting the contents of the first portion one place to the right and inserting the least significant bit of said partial result into the most significant bit position of said first portion, while at the same time loading the re-

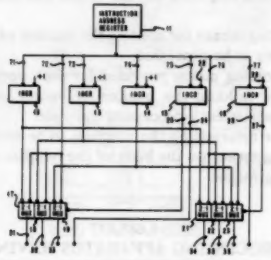
maining bits of said partial result in parallel into said second portion.

4,685,078

DUAL INCREMENTOR

Abraham Torres, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1984, Ser. No. 666,703
Int. Cl.[4] G06F 7/50
U.S. Cl. 364—770 **6 Claims**



1. A binary incrementor for incrementing a binary number having a plurality of bits separated into most significant groups of bits in ascending order and a least significant group of bits, input, thereto, comprising:

a first means for separately incrementing each of the most significant groups of bits of the inputted binary number, said first means producing a carry signal for each of said incremented most significant groups if the incrementation thereof results in a carryout;

a second means for incrementing the least significant group of bits of the inputted binary number, said second means producing a control signal if the incrementation thereof results in a carryout; and

means having said incremented most significant groups of bits and most significant groups of bits of the inputted binary number as inputs thereto for coupling selective ones of said incremented most significant groups and said most significant groups of the inputted binary number to outputs thereof in response to said carry and control signals generated by said first incrementing and said second incrementing means, said coupling means couples a selected group of the incremented most significant groups of bits subsequent to the production of a carryout in each and every incremented most significant group of bits of descending order and in the incremented least significant group of bits;

whereby signals appearing on outputs of the coupling means and outputs of the second incrementing means represent the increment of said binary inputted number.

4,685,079

RIPPLE-BORROW BINARY SUBTRACTION CIRCUIT

John Armer, Middlesex, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Dec. 14, 1984, Ser. No. 682,014
Int. Cl.[4] G05F 7/50
U.S. Cl. 364—784 **6 Claims**

1. A binary subtracter stage for subtracting a first single bit binary number Y from a second single bit binary number X, comprising:

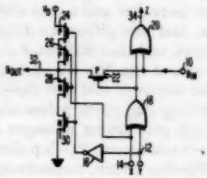
first and second binary input terminals for applying binary numbers X and Y respectively;

a borrow input and a borrow output terminal;

a first XOR gate having first and second input terminals coupled to said first and second binary input terminals respectively, and having an output terminal;

a second XOR gate having first and second input terminals coupled respectively to said borrow input terminal and the output terminal of said first XOR gate, and having an output terminal for producing an output signal corresponding to the difference of X minus Y;

a pass transistor having a primary conduction path coupled between said borrow input and borrow output terminals, and having a control electrode coupled to the output terminal of said first XOR gate; and



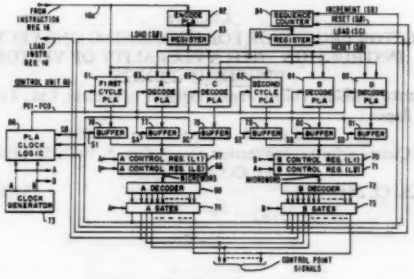
a three state logic circuit having first and second input terminals coupled to said first and second binary input terminals and an output terminal coupled to said borrow output terminal, said three state logic circuit generating a first logic output level according to the logic function $\overline{X}Y$, a second logic output level according to the logic function $X\overline{Y}$ and a high impedance output state otherwise, where the terms $\overline{X}$ and $\overline{Y}$ connote the logic complement of the binary values of X and Y respectively.

4,685,080

MICROWORD GENERATION MECHANISM UTILIZING SEPARATE PROGRAMMABLE LOGIC ARRAYS FOR FIRST AND SECOND MICROWORDS

Joseph C. Rhodes, Jr., Boca Raton; Victor S. Moore, Pompano Beach, and Wayne R. Kraft, Coral Springs, John W. Barrs, Hialeah, all of Fla., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Feb. 22, 1982, Ser. No. 350,663
Int. Cl.[4] G06F 9/00
U.S. Cl. 364—900 **7 Claims**



1. In a microprogrammed data processor wherein a unique sequence of microwords are used to control execution of each processor instruction, an improved microword generation mechanism comprising:

a first programmable logic array mechanism responsive to an operation determining portion of a processor instruction to be executed for providing the first microword of said unique sequence needed in the execution of this processor instruction;

a second programmable logic array mechanism responsive to an operation determining portion of this same processor instruction to be executed for providing the second microword of said unique sequence needed in the execution of this processor instruction;

and at least one additional programmable logic array mechanism responsive to an operation determining portion of this same processor instruction to be executed for providing the remainder of microwords of said unique sequence needed to execute this processor instruction;

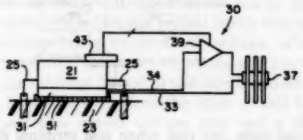
said microword generation mechanism having said first and second programmable logic array mechanisms that are smaller and have faster response time than the additional programmable logic array mechanism or mechanisms.

4,685,081

PELTIER JUNCTION USED FOR THERMAL CONTROL OF SOLID STATE DEVICES

Jay L. Richman, Montville, N.J., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Dec. 17, 1984, Ser. No. 682,622
Int. Cl.[4] G11C *19/08*; H01L *35/30*
U.S. Cl. 365—1 **21 Claims**



1. Temperature control system for a solid state device having threshold levels of logic in which heating and chilling is controlled locally at the device, characterized by:

(a) a pair of Peltier junctions in a Peltier circuit, one of which Peltier junctions is placed in thermal communication with the solid state device;

(b) temperature sensing means, responsive to temperature of the solid state device;

(c) a current control circuit which is responsive to the temperature sensing means and which controls current flow in the Peltier junction circuit in response to a difference in temperature between a predetermined target temperature and temperature sensed by the temperature sensing means; and

(d) the temperature sensing means being thermally connected to said solid state device.

4,685,082

SIMPLIFIED CACHE WITH AUTOMATIC UPDATE

Kin L. Cheung, N. Andover, and Jeffrey W. Einarson, N. Chelmsford, both of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Feb. 22, 1985, Ser. No. 704,359
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—49 **23 Claims**

9. In a memory system including means and encachement means responsive to addresses and in which the encachment means performs cache read operations and cache write operations substantially faster than the memory means performs memory write operations,

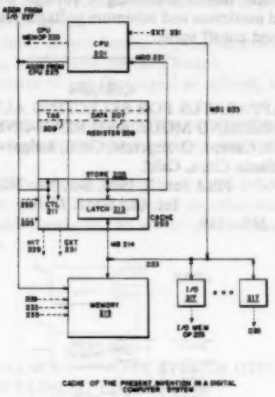
apparatus for performing a cache read operations while the memory means performs a memory write operation comprising:

(1) means connected to the encachement means and the memory means for providing the data to be written to the memory means substantially simultaneously to the memory means and the encachement means;

(2) first address providing means for providing a first address for use in the cache read operation to the encachement means;

(3) second address providing means for receiving a second address used in the memory write operation and providing the second address to the encachement means for use in the cache write operations; and

(4) selection means connected to the first and second address providing means and the encachement means for selecting the first address and providing the first address to the encachement means before the encachement means is



required to begin performing the cache write operation using the data on the data providing means and providing the second address to the encachement while performing the cache write operation

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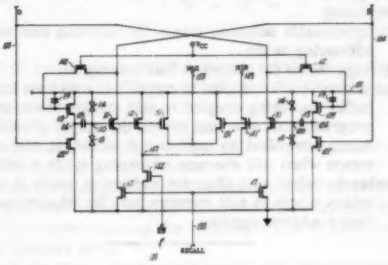
4,685,083

IMPROVED NONVOLATILE MEMORY CIRCUIT USING A DUAL NODE FLOATING GATE MEMORY CELL

Horst Leuschner, Phoenix, Ariz., assignor to Thomson Components-Mostek Corporation, Carrollton, Tex.

Filed Oct. 3, 1985, Ser. No. 783,493
Int. Cl.[4] G11C *11/40*
U.S. Cl. 365—185 **5 Claims**



1. A nonvolatile memory circuit comprising an array of nonvolatile memory elements;

means for applying data to said array of nonvolatile memory elements; and

means for applying high voltage to selected terminals of said nonvolatile memory elements, thereby storing said data applied to said array of nonvolatile memory elements;

characterized in that:

said means for applying high voltage comprises at least one dual node floating gate nonvolatile memory cell having first and second floating gates for defining a complementary pair of storage nodes and a maximum voltage terminal and a minimum voltage terminal, said terminals carrying the maximum and minimum voltage of those voltages on said first and second floating gates of said at least one dual node memory cell;

comparison means for comparing said maximum and minimum voltages; and

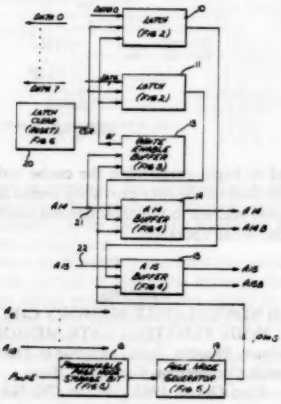
means for terminating the application of high voltage to said selected terminals in response to a signal from said comparison means indicating a voltage difference between said maximum and minimum voltages less than a predetermined cutoff value.

4,685,084

APPARATUS FOR SELECTING ALTERNATE ADDRESSING MODE AND READ-ONLY MEMORY

George R. Canepa, Orangevale, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Jun. 7, 1985, Ser. No. 742,459
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—189 10 Claims



1. In an integrated circuit, read-only memory having n address lines used for accessing p words in one addressing mode, an improvement for providing an alternate addressing mode, comprising:

programmable selection means for selecting said alternate addressing mode;

storage means for storing at least one signal;

an address buffer coupled to one of said n address lines, said buffer also being coupled to said storage means and said programmable selection means, the output of said buffer being controlled by said signal stored in said storage means when said alternate addressing mode is selected,

whereby when said alternate addressing mode is selected said p words in said memory may be selected with less than n address signals.

4,685,085

NON-VOLATILE RAM CELL WITH CHARGE PUMPS

John R. Spence, Villa Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jun. 17, 1985, Ser. No. 745,746
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—190 20 Claims

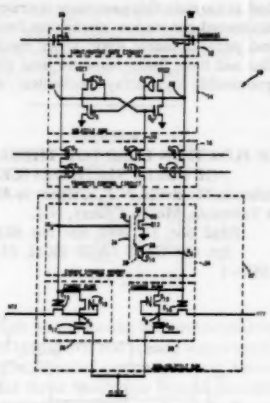
1. A memory cell circuit comprising:

a flip-flop having first and second stable states;

means for establishing said flip-flop in said first state;

a non-volatile storage element having first and second states corresponding to said first and second states of said flip-flop, respectively, said non-volatile element including a terminal having a predetermined voltage when said non-volatile element is in said second state; and

a transfer circuit connected to said flip-flop and to said non-volatile element, for selectively connecting said flip-flop to said terminal after said flip-flop has been established in said first state, so that when said terminal has said predetermined voltage said flip-flop is flipped to said



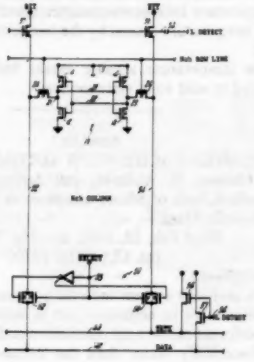
second state, but that when said terminal does not have said predetermined voltage said flip-flop remains in said first state.

4,685,086

MEMORY CELL LEAKAGE DETECTION CIRCUIT

Hiep V. Tran, Carrollton, Tex., assignor to Thomson Components-Mostek Corp., Carrollton, Tex.

Filed Nov. 14, 1985, Ser. No. 798,040
Int. Cl.[4] G11C *11/40*
U.S. Cl. 365—203 7 Claims



1. In an integrated circuit SRAM memory, the combination comprising:

a memory array of static memory cells having first and second cell nodes, said cell nodes carrying a logic one voltage and a logic zero voltage when operating correctly and an intermediate voltage when short-circuited;

means for connecting each of said first and second cell nodes to corresponding first and second input test nodes;

first and second pullup transistors connected between a power supply terminal and corresponding first and second intermediate nodes;

a first pulldown transistor connected between said first intermediate node and ground having a first gate connected to said first input test node;

a second pulldown transistor connected between said second intermediate node and ground and having a second gate connected to said second input test node;

means for activating said first and second pullup transistors, thereby establishing first and second current paths from said power supply terminal to ground through said first and second intermediate nodes, respectively, each of said first and second current paths carrying a current dependent on the voltage state of said first and second cell nodes, whereby said first and second intermediate nodes carry a corresponding logic one voltage and a corresponding logic zero voltage when said memory cell is operating correctly and a corresponding intermediate voltage when said memory cell is short-circuited; and

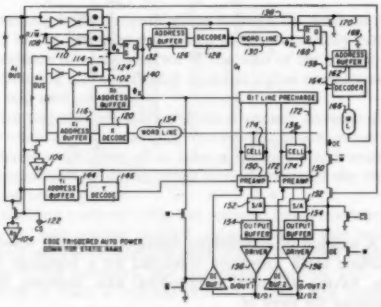
a logic circuit having first and second inputs connected to said first and second intermediate nodes respectively and an output having first and second output voltage states, which logic circuit is responsive to input states having identical or different voltage states and has an input trip point for each of said first and second inputs that is related to said corresponding intermediate voltage, whereby a normally operating memory cell places said corresponding logic zero voltage on one of said inputs and said corresponding logic one voltage on the other of said inputs to produce said first output voltage state and a short-circuited cell places said corresponding intermediate voltage on both of said inputs to produce said second output voltage state.

4,685,087

SRAM WITH CONSTANT PULSE WIDTH

Ashwin H. Shah, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 31, 1983, Ser. No. 528,374
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—227 **13 Claims**



1. A static random access memory comprising:

(a) an array of memory cells arranged in rows and columns having associated circuit means;

(b) address decoder means for receiving a plurality of address bits to select a particular one of said memory cells;

(c) said address decoder comprising row address decoder means to decode bits of said address bits corresponding to a row of said array, and column address decoder means to decode bits of said address bits corresponding to a column of said array; and

(d) power-up means, connected to said row and column address decoder means and to said associated circuit means, responsive to a transition in said address bits for initially powering up said row decoder means, subsequently powering up said column decoder means, then powering up said associated circuit means and powering down said row decoder means and said column decoder means and then powering down said associated circuit means;

(e) said power-up means comprising means to provide a first signal having a first predetermined duration to power up said row decoder means;

(f) first signal delay means having a predetermined delay corresponding to said row decoder means;

(g) means responsive to said first signal to activate said first delay means;

(h) means responsive to a first predetermined delay in said first delay means to power up said column decoder means; and

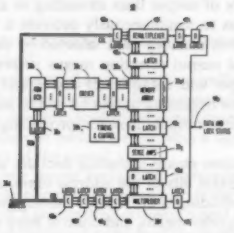
(i) means responsive to a second predetermined delay in said delay means to power down said row decoder means and column decoder means and to power up said associated circuit means.

4,685,088

HIGH PERFORMANCE MEMORY SYSTEM UTILIZING PIPELINING TECHNIQUES

Robert A. Iannucci, Quincy, Mass., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 15, 1985, Ser. No. 722,920
Int. Cl.[4] G11C *8/00*
U.S. Cl. 365—230 **7 Claims**



1. A high performance pipelined memory system for reading data from memory in a pipelined fashion, comprising:

an address bus;

a data output line;

a memory array having rows and columns wherein one of said columns is a lock column;

a multiplexer having a first and second input and an output;

row selection means, connected between said address bus and said memory array, for selecting a row of data from said memory array;

row refresh means, connected between said memory array and said multiplexer at said first input, for refreshing said requested row of data;

column selection delay means, connected between said address bus and said multiplexer at said second input, for selecting a column from said selected row of data and for assuring that said selected column and said selected row of data arrive at their respective inputs of said multiplexer at substantially the same time,

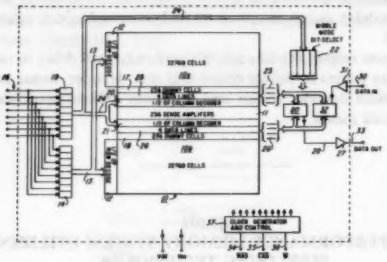
wherein a plurality of subsequent row selections and column selections can be propagated through said system before the data resulting from the first row selection and column selection appears at said output line, and

wherein said lock column is for storing information that a first processor is using said selected row of data, thereby inhibiting subsequent processors from using said selected row of data until said first processor has completed using said selected row of data.

4,685,089
HIGH SPEED, LOW-POWER NIBBLE MODE CIRCUITRY FOR DYNAMIC MEMORY

Pravin P. Patel, and Roger D. Norwood, both of Sugar Land, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 29, 1984, Ser. No. 645,579
Int. Cl.[4] G11C *11/40*
U.S. Cl. 365—233 **8 Claims**



1. A semiconductor memory device having an array of rows and columns of memory cells, and column lines coupled to said columns of cells, the column lines being in groups, and addressing means for selecting rows and columns based upon input addresses, comprising:

a plurality of output lines extending to all of said groups of columns to simultaneously provide a plurality of bits of data from memory cells selected by the input address,

sequential output selection means receiving certain bits of said input address to select one of said plurality of output lines as a beginning output bit and to sequence through the remaining output lines for producing output bits therefrom,

said selection means including decoder means responsive to said certain bits of the address input, shift register means for circulating a bit from a starting point determined by said decoder means, and control latch means to temporarily hold outputs of the decoder means and shift register means,

a plurality of output data latches each coupled to one of said plurality of output lines and holding said output bits,

means for coupling said output bits from said output data latches to a single output terminal in a sequence controlled by the contents of said control latch means,

wherein said shift register means includes a plurality of stages having inverters, and each inverter has a clocked load and a clocked transfer gate, and means for clocking the transfer gates of the inverters using shift dock voltage pulses at a repetition rate based on a memory control input to the device, and for clocking the loads with a fixed-length clock derived from said memory control input and having a dwell time significantly less than the dwell time of said shift clock voltage pulses.

4,685,090
TUBULAR ARTICLE

David H. Krevor, San Carlos, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Nov. 27, 1985, Ser. No. 802,507
Int. Cl.[4] G01V *1/38*
U.S. Cl. 367—20 **17 Claims**

1. A tubular article comprising:

(a) an outer layer comprising a polymeric material having a Young's modulus of at least about 10^7 Pascals;

(b) an interior layer comprising a polymeric material having a loss tangent of at least about 0.5 at a temperature of from about 0° C. to about 40° C. and at a frequency of from 10–4,000 Hz and a Young's modulus less than the Young's modulus of the material of the outer layer; and

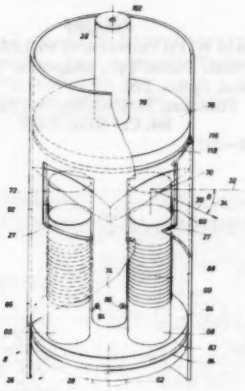
(c) an inner layer having a Young's modulus from 10^7 to 10^{10} Pascals, said modulus being greater than the Young's modulus of said interior layer;

said layers being joined together to form a laminated tubular structure in which the interior layer is constrained due to its lamination to the inner and outer layers such that the article exhibits constrained layer damping.

4,685,091
METHOD AND APPARATUS FOR ACOUSTIC WELL LOGGING

Jing-Yau Chung, Houston; Sen-Tsuen Chen, Sugarland; James C. Wainerdi, College Station, and Mark A. Miller, Houston, all of Tex., assignors to Exxon Production Research Co., Houston, Tex.

Filed May 10, 1984, Ser. No. 609,066
Int. Cl.[4] G01V *1/00*; H04R *17/00*
U.S. Cl. 367—31 **25 Claims**



1. A method of establishing multipole acoustic waves in a subsurface earth formation traversed by a borehole with a sonde, having a central longitudinal axis, disposed therein, comprising the steps of:

simultaneously generating 2N acoustic pressure waves, where N is an integer not less than one, originating from a corresponding number of discrete locations spaced radially outward from said central longitudinal axis so that said waves will propagate initially along respective wave axes in directions substantially parallel to said central longitudinal axis, said wave axes being oriented so that the projections, in a plane perpendicular to the central longitudinal axis, of lines intersecting the central longitudinal axis and the wave axes define a plurality of approximately equal angles α, wherein α is approximately equal to $360°/2N$, and so that any first one of the waves traveling along a corresponding first one of the wave axes is substantially out of phase with respect to any second one of the waves traveling along a corresponding second one of the wave axes, where the first wave axis and the second wave axis are separated by angle α with respect to the central longitudinal axis; and reflecting said waves sub-

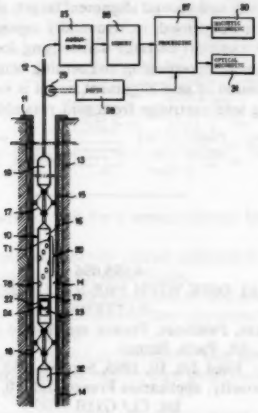
stantially radially outward from said central longitudinal axis into said formation.

4,685,092

METHOD AND APPARATUS FOR THE ACOUSTIC INSPECTION OF A BOREHOLE FITTED WITH CASING

Alain Dumont, Paris, France, assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Sep. 5, 1985, Ser. No. 772,594
Claims priority, application France, Sep. 5, 1984, 84 13673
Int. Cl.[4] G01V *1/40*
U.S. Cl. 367—35 **21 Claims**



1. A method for the acoustic inspection of a borehole fitted with a casing and passing through ground formations, comprising:

(a) emitting a first acoustic pulse through the medium present in the casing and directed at a substantially normal incidence towards a sector of the wall of the casing;

(b) obtaining a first reflected acoustic signal corresponding to said emitted pulse;

(c) emitting though said medium a second acoustic pulse directed at a substantially normal incidence towards a reference reflector of at least a geometry and material substantially similar to those of said sector of the casing being investigated;

(d) obtaining a second reflected acoustic signal corresponding to said second emitted pulse, wherein said second signal reflects information regarding at least said medium, said casing geometry, and said casing material; and

(e) from at least a selected portion of said first obtained signal and a selected portion of said second obtained signal, forming one or more corrected signals in which the influences of said medium and said casing geometry and casing material are substantially eliminated, said corrected signals being representative of at least one data item relating to at least one of said casing and said material surrounding said casing.

4,685,093

SPEED MEASUREMENT DEVICE

Michael J. Gill, Milford-on-Sea, England, assignor to Brookes & Gatehouse Limited, England

Filed Apr. 3, 1985, Ser. No. 719,475
Int. Cl.[4] G01F *1/66*
U.S. Cl. 367—89 **11 Claims**

11. A speed measuring device for measuring the speed of a marine vessel comprising:

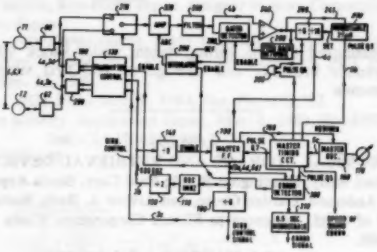
first transducer means,

second transducer means,

the first and second transducer means being mountable on the marine vessel below the water line thereof so as to face one another across an acoustic path in substantially the direction of motion of the vessel,

transmitter means connected to said first and second transducer means for selecting one of the first and second transducer means and for energizing the selected transducer means for transmission of an acoustic signal along the acoustic path and further including means for changing the selection of the transducer means so as to change the direction of said transmission,

receiver means connected to said first and second transducer means for processing the acoustic signal as received at the non-selected transducer means and for determining the arrival time of said acoustic signal,



control means for controlling the transmitter means and receiver means; and

processing means connected and responsive to the transmitter means and the receiver means for processing the transit time of acoustic signals in both directions between the first and second transducer means for deriving a signal indicative of the speed of the vessel,

wherein the receiver means includes a comparison circuit having a variable comparison level for identifying three different levels of a transmitted acoustic signal and means for sensing a predetermined number of successful comparisons by said comparison circuit which predetermined number of comparisons includes at least one comparison at each of said three levels, the comparisons being made in a predetermined order and the receiver means indicating when said predetermined number of comparisons has been sensed.

4,685,094

LATERAL COMPLIANCE DEVICE FOR GEOPHONE SPRINGS

Frederick A. Vitringa, Quathiaski Cove, Canada, and Arend L. Hagedoorn, Leiden, Netherlands, assignors to Geosource Inc., Houston, Tex.

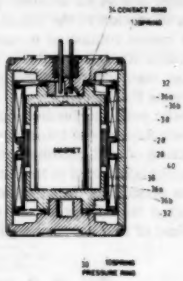
Filed Nov. 30, 1984, Ser. No. 676,524
Int. Cl.[4] F16F *7/00*; F16M *7/00, 11/00*; H04R *9/00*
U.S. Cl. 367—183 **13 Claims**

1. In a geophone having a pole piece member and having a reference mass suspended for movement along a vertical axis, and a spring system for suspending the reference mass, the spring system having a stiff spring constant for movement lateral to the vertical axis such that the ratio of spurious resonant frequency to the natural frequency of the spring system is at least 20 to 1, the spring system comprising:

(a) first suspension means for suspending the reference mass along the vertical axis and for centering the reference mass both laterally and along the axis, and

(b) second suspension means for centering the reference mass both laterally and along the axis, and for providing a heavily damped compliance in a lateral direction to the movement of the reference mass, comprising a pressure

ring means for pushing the first suspension means against the pole piece member, whereby lateral movement is



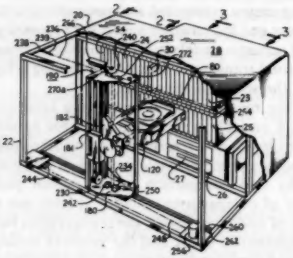
permitted for the spring system under shock loads to reduce breakage and damage to said first suspension means.

4,685,095

OPTICAL STORAGE AND RETRIEVAL DEVICE

Michael Rudy, Huntington Beach; Paul Cary, Santa Ana; Gary S. Anderson, Garden Grove, and Arthur A. Roth, Santa Ana, all of Calif., assignors to Filenet Corporation, Costa Mesa, Calif.

Filed Jul. 11, 1984, Ser. No. 629,694
Int. Cl.[4] G11B *17/00, 5/48*
U.S. Cl. 369—36 **16 Claims**



1. A method of moving video disk cartridges said cartridges having an engaging aperture on said cartridge, said cartridges being removably insertable into at least one of a plurality of apertures, said apertures having an alignment target adjacent a plurality of said apertures comprising:

locating the position of each of said alignment targets with respect to a reference position;

storing information representative of the locations of said alignment targets in a computer;

positioning a rotatable transport carriage at the location stored in said computer for a first of said apertures, said first aperture containing a cartridge therein;

verifying the alignment of said rotatable transport carriage by sensing said alignment target adjacent said first aperture, and if not sensed, incrementally repositioning said rotatable transport carriage and sensing for said alignment target until said target is sensed and the alignment of said rotatable transport carriage is verified;

extending an engaging member from said rotatable transport carriage;

engaging said engaging aperture with said engaging member;

retracting said engaging member and the engaged cartridge into said rotatable transport carriage;

detecting when said engaging member and the engaged cartridge are retracted into said rotatable transport carriage a predetermined distance;

containing said cartridge in said rotatable transport carriage during transportation and rotation of said rotatable transport carriage and cartridge;

transporting and rotating said rotatable transport carriage and cartridge to the location of a second alignment target, information representative of said location of said second alignment target being stored in said computer, said transportation being in a plane defined by two mutually-perpendicular axes, said rotation being about an axis substantially perpendicualr to said plane;

verifying the alignment of said rotatable transport carriage by sensing said second alignment target, and if such verification is not sensed, incrementally repositioning said rotatable transport carriage and sensing for said alignment target, said repositioning and sensing being repeated until the location of said alignment target is verified; and

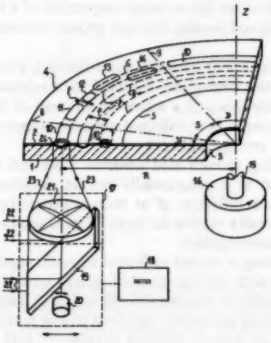
extending said cartridge from said rotatable transport carriage.

4,685,096

OPTICAL DISK WITH PRE-RECORDED MARKER PATTERN

Rene Romeas, Palaiseau, France, assignor to Alcatel Thomson Gigadisc, SA, Paris, France

Filed Jul. 10, 1985, Ser. No. 753,538
Claims priority, application France, Jul. 10, 1984, 84 10940
Int. Cl.[4] G11B *7/00*
U.S. Cl. 369—44 **15 Claims**



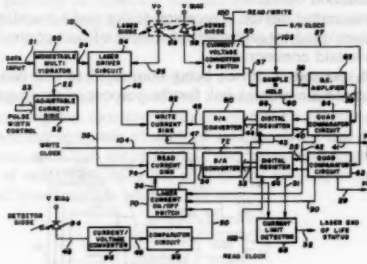
1. Optical recording medium comprising a track divided into sectors and having a longitudinal axis, areas on said track for writing data using a predetermined increment, prewritten marker areas on said track alternating with said data writing areas and each comprising at least two patterns having leading and trailing edges, and a part of at least one of said patterns which is offcenter relative to said axis and associated with at least one edge of a pair of leading and trailing edges combined with another pair of leading and trailing edges to define along said axis two predetermined distances each of which is between two consecutive multiples of said data writing increment, whereby said patterns are adapted to be scanned optically in succession by a read spot to sense any track following error by virtue of interaction of said read spot with at least said offcenter pattern part and with reference to a timebase synchronization signal resulting from interaction of said read spot with at least two leading edges and at least two trailing edges.

4,685,097

POWER CONTROL SYSTEM FOR A SEMICONDUCTOR LASER

Henk A. van der Put, Colorado Springs, Colo., assignor to Laser Magnetic Storage International Company, Colorado Springs, Colo.

Filed Jul. 25, 1985, Ser. No. 758,902
Int. Cl.[4] G11B 7/00
U.S. Cl. 369—54 **10 Claims**



1. A power control circuit for a semiconductor laser diode comprising:

a variable current laser driver circuit adapted to be connected to a semiconductor laser diode,

write current control means connected to said laser driver circuit for controlling the current flow generated during a write mode of operation,

read current control means connected to said laser driver circuit for controlling the current flow generated during a read mode of operation,

sense diode means for detecting the optical output of a semiconductor laser diode which is connected to said laser driver circuit, where said sense diode means allows a current to flow in relationship to the optical output of said laser diode,

current/voltage converter and switch means connected with said sense diode means for producing a voltage in response to a current flowing in said sense diode means and for switching the output voltage between a read channel output and a write channel output in response to a read/write control signal,

a read channel comparator circuit connected to the read channel output of said current/voltage converter and switch means for producing an output signal indicative of whether said read channel output is within or outside of predetermined values,

read channel digital register means connected to said read channel comparator circuit for maintaining a number representative of the read current to be supplied to a laser diode and for incrementing and decrementing said number in response to output signals received from said read channel comparator circuit,

read channel D/A converter means connected to said read channel digital register means for converting said number to an analog signal and connected to said read current control means for providing said analog signal to control read current,

write channel sample and hold means connected to said current/voltage converter and switch means for holding the peak value of the output of said sense diode means during a write operation,

a write channel comparator circuit connected to said write channel sample and hold means for producing an output signal indicative of whether said write channel output is within or outside of predetermined values,

a write channel digital register means connected to said write channel comparator circuit for maintaining a number representative of the write current to be supplied to a laser diode and for incrementing and decrementing said number in response to output signals received from said write channel comparator circuit,

write channel D/A converter means connected to said write channel digital register means for converting said number to an analog signal and converter to said write current control means for providing said analog signal control write current,

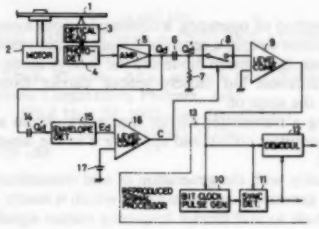
whereby laser read power level is maintained within predetermined values and the laser write power level is maintained within predetermined values.

4,685,098

APPARATUS FOR REPRODUCING DATA SIGNAL

Tadao Yoshida, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan

PCT No. PCT/JP84/00091, § 371 Date Nov. 7, 1984, § 102(e) Date Nov. 7, 1984, PCT Pub. No. WO84/03581, PCT Pub. Date Sep. 13, 1984
PCT Filed Mar. 8, 1984, Ser. No. 673,752
Claims priority, application Japan, Mar. 8, 1983, 58-38053
Int. Cl.[4] H04N 5/76; G11B 5/09
U.S. Cl. 369—59 **10 Claims**



1. An apparatus having a reproducing head for reproducing a recorded digital data signal modulated in accordance with a modulation system in which the interval between each two successive level transitions from one to the other of two different levels corresponding to binary data, respectively, is provided in a predetermined manner, the data signal being recorded on a recording medium together with a synchronous signal, the apparatus comprising: waveform shaping means for obtaining a reproduced signal of rectangular waveform resulting from comparing the level of the reproducing head output signal with a predetermined level; reproduced signal processing means including a synchronous signal detector being supplied with the reproduced signal of rectangular waveform for detecting said synchronous signal recorded with said digital data signal and producing an output therefrom and a demodulating circuit receiving said reproduced signal of rectangular waveform and said output from said synchronous signal detector; amplitude detecting means including an envelope detector for detecting the amplitude of the envelope of the reproducing head output signal and a level comparing means for comparing the envelope amplitude level with a nonzero reference level and producing an output signal indicative thereof; and interrupt means responsive to said output signal from said amplitude detecting means for preventing the reproduced signal of rectangular waveform obtained by the waveform shaping means from being supplied to the reproduced signal processing means when the envelope amplitude of the reproducing head output signal detected by the amplitude detecting means is less than a predetermined value, whereby erroneous detection of a synchronous signal by said synchronous signal detector is prevented.

4,685,099

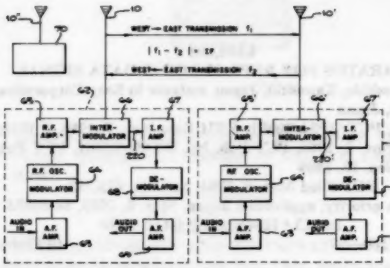
METHOD AND APPARATUS FOR DUPLEX COMMUNICATIONS

Donald R. White, Irvine, and Michael R. Harrison, Placentia, both of Calif., assignors to Maxon Electronics Co. Ltd., Seoul, Rep. of Korea

Continuation-in-part of Ser. No. 455,854, Jan. 5, 1983, abandoned, which is a continuation-in-part of Ser. No. 379,760, May 19, 1982, abandoned. This application Jul. 5, 1983, Ser. No. 510,631

Int. Cl.[4] H04J *1/00, 15/00*

U.S. Cl. 370—30 **19 Claims**



1. The method of operating a communications system having a transmitter circuit, a receiver circuit, and an input-output circuit in both the transmit mode and the receive mode concurrently on different but closely spaced carrier frequencies, comprising the steps of:

generating a transmitter carrier frequency output signal in the transmitter circuit and applying it to the input-output circuit;

concurrently with the generation of said transmitter output signal, generating an image signal which is nearly equal in magnitude to said carrier frequency output signal and of substantially opposite phase;

summing said transmitter output signal and said image signal to produce a greatly attenuated version of said output signal to serve as a local oscillator signal;

applying said local oscillator signal to the receiver circuit to assure an acceptable signal level incident at said receiver circuit;

receiving an incoming signal of a different but closely spaced carrier frequency at the input-output circuit;

directing the incoming signal to the receiver circuit so that said local oscillator signal and the incoming signal presented to said receiver circuit are of compatible magnitudes; and

utilizing said receiver circuit to produce a heterodyne action between said incoming and local oscillator signals so as to enable recovery of the intelligence carried by the incoming signal.

4,685,100

DIGITAL TRUNK ADAPTER TERMINAL UNIT

Christian Coppens, Velizy; Gilbert Perron, Plaisir, and Jean Pouillard, Villeneuve Saint Georges, all of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Jun. 12, 1985, Ser. No. 743,844

Claims priority, application France, Jun. 12, 1984, 84 09151

Int. Cl.[4] H04Q *11/04;* **H04J** *3/12*

U.S. Cl. 370—58 **11 Claims**

1. An adapter terminal unit for connecting to a time-division switching center at least one digital trunk conforming to a signalling standard different from that normally applicable to the digital trunks connected to said switching center, said digital trunk including a transmit multiplex link and a receive multiplex link, said switching center including a switching network, and said adapter terminal unit being controlled via said switching network by a pool of microprocessor-equipped control units, said adapter terminal unit being connected to said switching network by multiplex links called switching network input/output lines, said adapter terminal unit comprising:

a control circuit having a microprocessor;

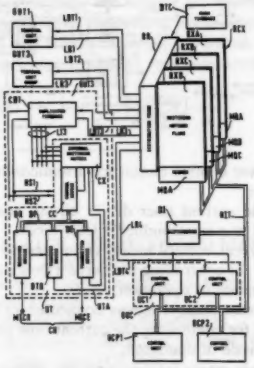
a space-division switching matrix;

a bidirectional multiplex link;

a common bus; and

a transmitter device, a receiver device and a transfer device controlled by said microprocessor of said control circuit via said common bus;

said transmitter device being connected to one end of said transmit multiplex link for the purpose of sending samples



combining information bits from the switching center and supervisory signals provided in matched form via the microprocessor;

said receiver device being connected to one end of said receive multiplex link for the purpose of separating information bits to be sent via the switching center and the supervisory signals to be matched via the microprocessor for processing by the control units; and

said transfer device being connected to said switching matrix via said bidirectional multiplex link, and being connected to said transmitter device and to said receiver device, for the purpose of two-way exchange of samples between said digital trunk and said switching center following conversion and matching under the control of said microprocessor.

4,685,101

DIGITAL MULTIPLEXER FOR PCM VOICE CHANNELS HAVING A CROSS-CONNECT CAPABILITY

Henry P. Segal, Ridgefield, Conn., and Carl Dewilde, Stony Brook, N.Y., assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 20, 1984, Ser. No. 683,901

Int. Cl.[4] H04J *3/22, 3/04*

U.S. Cl. 370—84 **13 Claims**

1. Apparatus for routing a plurality of PCM channels, received via transmission lines having one bit rate, into selected transmission lines having the same or a different bit rate, said apparatus comprising, in combination:

(a) a plurality of first terminals adapted for connection to the incoming transmission lines of respective low speed, duplex PCM highways;

(b) a plurality of second terminals adapted for connection to the outgoing transmission lines of respective low speed, duplex PCM highways;

(c) a plurality of third terminals adapted for connection to

the incoming transmission lines of respective high speed, duplex PCM highways;

(d) a plurality of fourth terminals adapted for connection to the outgoing transmission lines of respective high speed, duplex PCM highways;

(e) a bus network comprising:

(1) a plurality of transmitting bus data lines;

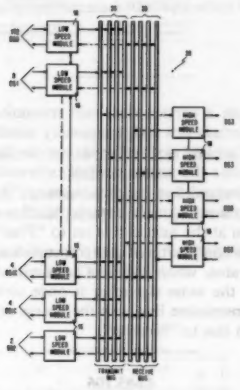
(2) a plurality of transmitting bus address lines;

(3) a plurality of receiving bus data lines; and

(4) a plurality of receiving bus address lines;

said bus lines being grouped into sets for parallel transmission of PCM samples and destination addresses, respectively;

(f) a plurality of low speed modules, each low speed module coupling a plurality of said first terminals to each of said transmitting bus data line sets and coupling a plurality of said second terminals to each of said receiving bus data line sets, each low speed module also being connected to each of said transmitting bus address line sets and to each of said receiving bus address line sets;



(g) a plurality of high speed modules, each high speed module coupling a single third terminal to a separate one of said receiving bus data line sets and coupling a single fourth terminal to a separate one of said transmitting bus data line sets, each high speed module also being connected to a separate set of said transmitting bus address lines and to a separate set of said receiving bus address lines;

wherein each PCM channel on each PCM highway has associated therewith a unique address, and wherein each module includes means for supplying and receiving addresses from said bus address lines thereby supplying a destination address on an address bus whenever a PCM sample is applied to a data bus,

whereby each PCM sample received on one PCM channel at a first or third terminal may be routed to any other PCM channel for outgoing transmission at a second or fourth terminal.

4,685,102

SWITCHING SYSTEM LOOPBACK TEST CIRCUIT

Conrad Lewis, Nepean, Canada, assignor to Mitel Corporation, Ontario, Canada

Filed May 11, 1984, Ser. No. 609,443

Claims priority, application Canada, Jun. 16, 1983, 430531

Int. Cl.[4] H04J *3/16*

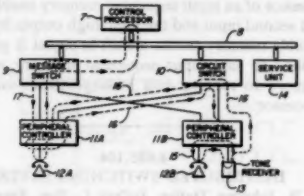
U.S. Cl. 370—15 **18 Claims**

1. A switching system test circuit comprising:

(a) a main system control means,

(b) switching means under control of the control means for switching any of a plurality of input paths to any of a plurality of output paths,

(c) supervisory and control circuit path means for connection between the switching means and the control means for transmitting and/or receiving signals between any of the output or input paths respectively and from the control means,



(d) one of the output paths being connected to one of the input paths externally of the switching means,

whereby a signal carried by any of the input paths can be switched to said one output path internal of the switching means and appear on said one input path, and be received by the control means, thus facilitating a test of said switching means.

4,685,103

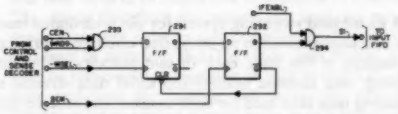
CONTROL CIRCUIT FOR A CENTREX ATTENDANT CONSOLE INTERFACE

James B. Black, Phoenix, Ariz., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Dec. 24, 1985, Ser. No. 813,321

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—58 **11 Claims**



1. A control circuit for effecting the transfer of data messages between an interface circuit and a CENTREX equipped central office exchange, said central office exchange including an analog control unit connected to a peripheral processor, said analog control unit including a control field for sending control signals to said control circuit and said interface circuit including an input sequential memory for receiving data messages from said peripheral processor, said control circuit comprising:

gating means including first and second inputs connected to said control field arranged to produce a logic high output signal responsive to the simultaneous application of a first and a second control signal;

first bistable memory means having a data input, a reset input and at least one output, said gating means output signal connected to said data input and said bistable memory means further including a clock input connected to a write select signal from said peripheral processor and in response to said write select signal said gating means output signal is stored in said first bistable memory means and applied to said output;

second bistable memory means having a data input and first and second outputs, said first bistable memory means output is connected to said second bistable memory means data input, and said second bistable memory means further including a clock input connected to a source of clocking signals where during a first rising edge of said clocking signal said second bistable memory means inputs said output signal from said first bistable memory means and

outputs a logic high output signal from said first output and a logic low signal from said second output; and

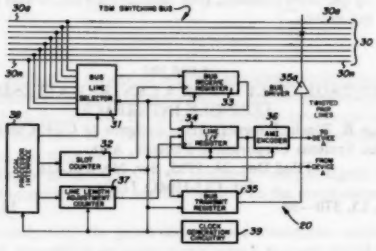
second gating means having first and second inputs and an output connected to said input sequential memory means, said first input connected to said second bistable memory means first output and said second input connected to said control field whereby, in response to the simultaneous presence of an input sequential memory enabling signal on said second input and the logic high output by said second bistable memory means a shift-in signal is generated and applied to said input sequential memory allowing said memory to receive data messages from said peripheral processor.

4,685,104

DISTRIBUTED SWITCHING SYSTEM

Charles B. Johnson, Dallas; Jeffrey L. Box, Farmers Branch, and David B. Hildebrand, Bedford, all of Tex., assignors to SRX Corporation, Dallas, Tex.

Filed Feb. 27, 1985, Ser. No. 706,320
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—67 **7 Claims**



1. A distributed switching system for use with digital instruments and implemented in an integrated circuit comprising:

a plurality of bus lines, each of said plurality of bus lines being time division multiplexed serial data streams and having time slots used for both transmit and receive directions;

bus line selector means for selecting one of said plurality of bus lines for performing a space switching function;

slot counter means for selecting one of said time slots to perform a time switching function;

bus interface shift registers interconnected to said plurality of bus lines for transmitting to and receiving data from said plurality of bus lines;

line interface shift registers for transmitting to and receiving data from the digital instruments; and

line-length adjustment means for facilitating positioning of receive clock strobes for compensating for propagation delays from said digital instruments.

4,685,105

LOOP TRANSMISSION METHOD

Toshihiro Shikama, Kamakura; Takahisa Ota, Tokyo; Michihiro Ishizaka, Kamakura; Hirofumi Kira; Akira Horiguchi, both of Kobe, and Yuji Kooi, Kamakura, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

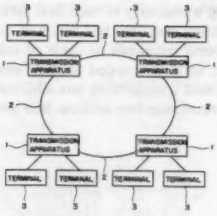
Filed Oct. 22, 1985, Ser. No. 790,252
Claims priority, application Japan, Oct. 22, 1984, 59-223301
Int. Cl.[4] H04J *3/00*
U.S. Cl. 370—86 **4 Claims**

1. A loop transmission method which makes a plurality of time-divided slots circulate on a looped transmission line connecting a plurality of transmission apparatuses, including a transmission apparatus sending out data having a destination address in said slots, and a transmission apparatus for receiving said data, thereby carrying out communication between said plurality of transmission apparatuses, characterized in that

each of said slots is provided with an access control region where the access control informations of "Free", "Busy" or "Neutral" are to be set,

in response to data transmission not being carried out, an access control information at one of said plurality of slots is set to "Free" and access control information at other slots are set to "Neutral" to thereby make said plurality of slots circulate on said looped transmission line,

in response to a transmission apparatus, having data to be transmitted, receiving an access control information of



"Free" from a certain slot, said transmission apparatus uses said certain slot and a necessary number of the slots subsequent to said slot and sends out the data to the slots, at which time the access control information at each of said slots transmitting the data is set to "Busy", and after the data transmission is completed, the access control information at the next slot is set to "Free", and

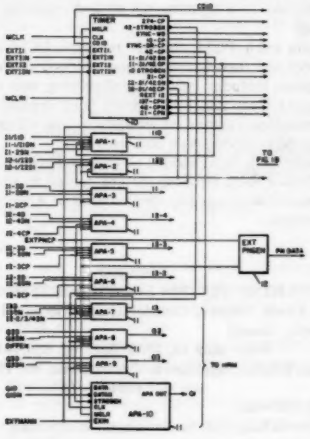
in response to completion of data transmission, said transmission apparatus, when said slot transmitted data thereby returns to the same slot after it once circulates on said looped transmission line, sets the access control information at said slot to "Neutral".

4,685,106

HIGH RATE MULTIPLEXER

Larry J. Miller, South Jordan; Glen D. Rattlingourd, Salt Lake City, and Clifford T. Johnson, Sandy, all of Utah, assignors to Sperry Corporation, Blue Bell, Pa.

Filed Aug. 31, 1984, Ser. No. 646,015
Int. Cl.[4] H04J *3/02*
U.S. Cl. 370—112 **20 Claims**



1. A multiplexing system comprising,

timer means for producing a plurality of timing signals,

said timer means adapted to receive a master clock signal and produce a plurality of timing signals including reduced rate clock signals which are supplied to other circuit components in said system,

phase adjuster means for aligning input data signals with internal timing signals from said timer means,

first multiplexer means capable of operation at a first rate connected to receive signals from said timer means and from said phase adjuster means and to supply output signals which are representative of the input data signals and the internal timing signals,

said first multiplexer means includes first synchronizer means which synchronizes the operation of said first multiplexer means, and

second multiplexer means capable of operation at a second rate other than said first rate connected to receive signals from said timer means and from said phase adjuster means and to produce output signals which are representative of the input data signal and the internal timing signals,

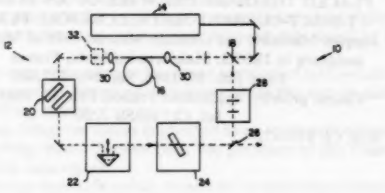
said second multiplexer means includes second synchronizer means which synchronizes the operation of said second multiplexer means.

4,685,107

DISPERSION COMPENSATED FIBER RAMAN OSCILLATOR

James D. Kafka; Thomas M. Baer, and David F. Head, all of Mountain View, Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Jun. 9, 1986, Ser. No. 872,295
Int. Cl.[4] H01S *3/30*
U.S. Cl. 372—6 **19 Claims**



1. A dispersion compensated fiber Raman oscillator for producing short pulses at any wavelength, comprising:

a synchronous pumping source;

an optical fiber optically aligned with the pumping source;

dispersion compensating delay means optically aligned with the fiber to allow short pulses of any wavelength to be received from the fiber;

ring configuration means for recirculating and passing optical pulses back through the fiber;

input coupling means; said synchronous pumping source being aligned with said input coupling means to input pumping pulses to the optical fiber;

output coupling means;

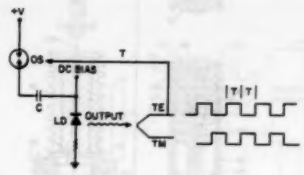
the optical fiber, dispersion compensating delay means, ring configuration means, input coupling means, and output coupling means being arranged in an oscillator configuration; said oscillator configuration further includes: a band width tuning means for tuning a range of wavelengths to provide good pulse quality and short pulse width, a temporal delay means for varying the path length in the oscillator configuration to thereby produce subpicosecond pulses.

4,685,108

OPTICAL MULTIVIBRATOR

Robert J. Seymour, Wellesley Hills; Jia-ming Liu, Arlington, both of Mass., and Ying C. Chen, Closter, N.J., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jul. 3, 1985, Ser. No. 751,660
Int. Cl.[4] H01S *3/098*
U.S. Cl. 372—19 **7 Claims**



1. An optical square wave multivibrator comprising

a semiconductor laser operating near the polarization transition temperature wherein said laser operates in a pure TM_{oo} mode at low injection currents and switches operation to a pure TE_{oo} mode at high injection currents, and vice versa, having large hysteresis loops with a high contrast ratio in its polarization-resolved power versus current characteristic while total power exhibits only slight change in hysteresis, the switching behavior of the TE mode being complementary to that of the TM mode;

means for biasing said laser for operation within said hysteresis loops;

means for applying a current pulse in one direction to said laser to cause said laser to provide a TE mode laser output, and for applying a current pulse in the opposite direction to cause said laser to provide a TM mode laser output; and

optical delay line means, having a delay time T, coupled to said laser so as to be responsive to initiation of light in said TE_{oo} mode therefrom for causing said applying means to apply a current pulse in said opposite direction to cause said laser to switch to said TM mode laser output, and so as to be responsive to cessation of light in said TE_{oo} mode from said laser for causing said means for applying a current pulse to apply a current pulse in said one direction to cause said laser to switch to said TE mode,

resulting in a polarization-bistable square wave output of period 2T with equal on and off duration T.

4,685,109

GAS LASER CONSTRUCTION

Lee R. Carlson, Pleasanton; Denes A. Hegedus, Redwood City; Steven M. Jarrett, Los Altos; Michael F. Miller, Mountain View; Martin E. Riley, Grass Valley, and David L. Wright, Rough and Ready, all of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Division of Ser. No. 649,206, Sep. 10, 1984, Pat. No. 4,649,547.
This application Sep. 11, 1986, Ser. No. 906,356
Int. Cl.[4] H01S *3/03*
U.S. Cl. 372—61 **24 Claims**

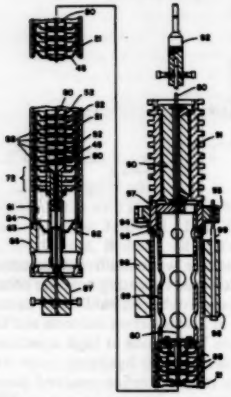
1. A method for assembling a plasma tube of a gas laser, comprising:

providing a ceramic tube with an internal wall having a precise diameter with alternately metallized and non-metallized areas at regular intervals along a longitudinal axis of the tube;

stacking with a stacking gauge, outside the ceramic tube, a series of heat webs and insulative spacers, in alternating relationship, the heat webs being thereby spaced apart substantially the same distance as the metallized areas in the ceramic tube, and the heat webs being of less diameter than the internal wall of the ceramic tube and having brazing material coated on their outer surfaces;

inserting the stack of heat webs and spacers together into the ceramic tube so that each heat web is adjacent to and in registry with a metallized area on the internal wall of the ceramic tube; and

heating the resulting assembly in vertical orientation generally uniformly to a sufficient temperature to expand the heat webs diametrically so that each engages outwardly against the adjacent metallized area of the ceramic tube, with the brazing material melting and causing the heat webs to be brazed to the metallized areas of the ceramic tube.



4,685,110

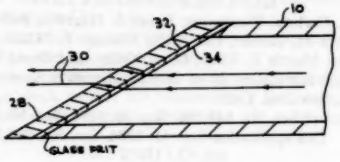
OPTICAL COMPONENT OF A LASER

Gary W. DeBell, Los Altos; David L. Wright, Rough and Ready; Kenneth A. Ruddock, Los Altos Hills; Alan B. Petersen, Palo Alto; Lee R. Carlson, Pleasanton, and Marc K. von Gunten, San Jose, all of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 654,305, Sep. 24, 1984. This application Sep. 3, 1985, Ser. No. 770,717

Int. Cl.[4] H01S *3/08*

U.S. Cl. 372—103 **61 Claims**



1. An optical component of a laser, said laser having a hot gas plasma region, a cold gas region and photon fluxes generated therein, comprising:

an optical element operatively associated with said laser having at least one surface exposed to and in communication with said photon fluxes; and

a coating means on said optical element surface exposed to said photon fluxes, said coating means being formed of a material adapted to minimize photoreduction of said optical element induced by said photon fluxes and selected from the group consisting of Al_2O_3, BeO, Y_2O_3, MgO, B_2O_3, Sc_2O_3, LiF, NdF_3, ThF_4, and Na_3AlF_6.

4,685,111

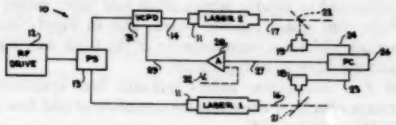
PHASE STABILIZATION FOR MODE LOCKED LASERS

Michael T. Baer, Mountain View, Calif., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed May 1, 1985, Ser. No. 730,001

Int. Cl.[4] H01S *3/098*

U.S. Cl. 372—18 **18 Claims**



1. A method for stabilizing a phase relationship between two mode locked lasers, comprising,

driving through a power splitter the mode lockers of both lasers from a single stable radio frequency source,

monitoring the phase of pulses from each laser utilizing a fast photodiode output of each laser,

feeding the output of the fast photodiodes to a phase detector and comparator,

measuring a relative phase difference between the lasers with a phase detector and comparator, thereby producing a voltage output signal or phase error signal representing the phase difference,

amplifying and filtering the voltage output signal with an amplifier and loop filter,

feeding the resulting output signal to a voltage controlled phase delay interposed between the power splitter and one of the lasers, and

delaying the RF drive to said one laser to achieve a desired phase relationship, between the two lasers.

4,685,112

ELECTRICAL CONNECTION DEVICE INTENDED TO BE PLACED THROUGH THE WALL OF AN ELECTRICAL DIRECT-CURRENT METALLURGICAL FURNACE

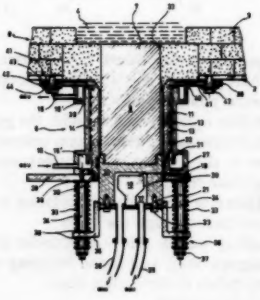
Jacques Michelet, and Ghislain Maurer, both of Metz, France, assignors to IRSID, Maizieres-les-Metz, France

Filed Feb. 10, 1986, Ser. No. 827,684

Claims priority, application France, Feb. 11, 1985, 85 02276

Int. Cl.[4] H05B *7/00*

U.S. Cl. 373—72 **9 Claims**



1. In an electrical connection device placed through the wall of an electrical direct-current metallurgical arc furnace an inner part consisting of a metal core (7) which at one end is flush with the inner surface of said vessel and at its other end and at its other end is extended in the form of a plug (10) integral therewith, a sleeve (11) of thermally conductive material which surrounds said inner part (7,10), is fastened to a shell (2) of said furnace, and has a cooling-fluid circulation circuit

(13), and means (20,31) connecting said metal core to an electrical supply, the improvement comprising

(a) a separation space (12) formed between said sleeve (11) and said metal core (7), to accomodate thermal expansion and contraction of said core in said sleeve; and

(b) an elastic fastening system for said inner part (7,10), which tends to return the latter at any moment to a position given to it during assembly.

4,685,113

DRIVER ISOLATING CIRCUIT FOR COMMON BUS-TYPE TRANSMISSION OF LOCAL AREA NETWORK

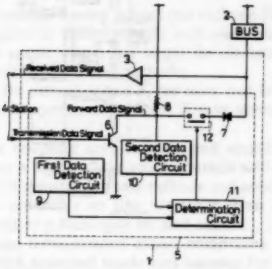
Susumu Hono, Amagasaki; Ichiro Okuda, Kobe; Hiroshi Ishihara, Mino, and Masahiko Hori, Itami, all of Japan, assignors to Mitsubishi Cable Industries, Ltd., Hyogo-ken, Japan

Filed Oct. 8, 1985, Ser. No. 785,516

Claims priority, application Japan, Nov. 9, 1984, 59-236950

Int. Cl.⁴ H02H *3/08*

U.S. Cl. 375—7 **6 Claims**



1. A driver transceiver for a common bus-type transmission system of a local area network comprising:

switching means for receiving a transmission data signal from a station and outputting a forward data signal to a bus;

diode means connected to an output terminal of said switching means for stopping data entry from the bus to said switching means;

first data detection means connected to an input side of said switching means for detecting the presence of the transmission data signal;

second data detection means connected to said output terminal of said switching means and said diode means for detecting the presence of the forward data signal;

determination means responsive to said first and said second data detection means for determining whether either one of said switching means and said diode means short-circuits and

control means, responsive to said determination means, for controlling the conduction between said switching means and the bus such that said switching means has no conduction path to said bus if either said switching means or diode means short-circuits.

4,685,114

WAVEFORM MODULATION SYSTEM

Peter A. Welling, Melrose, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Feb. 27, 1986, Ser. No. 833,154

Int. Cl.⁴ H03K *7/08*

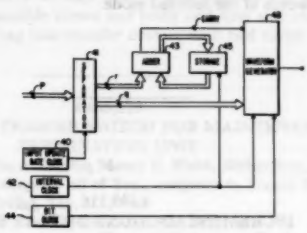
U.S. Cl. 375—22 **20 Claims**

1. An improved waveform modulation system for converting an input value having a known radix and a predetermined maximum number of preselected digits into a waveform having successive intervals, comprising:

means for separating the input value into a least significant value portion occupying a preselected number of least significant digits and into a most significant value portion occupying a preselected number of most significant digits;

means for storing a residual value;

means for combining, for each interval, said least significant value portion with said residual value from said means for storing to produce a carry for that interval and a successive residual value and for replacing the contents of said means for storing with said successive residual value; and



means for iteratively generating a waveform having a duration defined by the total number of digits and having successive intervals each having a duration defined by the preselected number of most significant digits and an underlying pulse width defined by said most significant value portion, said underlying pulse width modified by said means for generating according to the carry for that interval.

4,685,115

APPARATUS FOR TRANSMITTING DIGITAL SIGNALS

Kenzo Akagiri, Yokohama, and Masayuki Nishiguchi, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

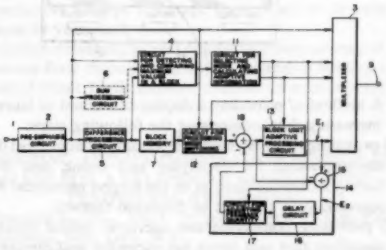
PCT No. PCT/JP85/00266, § 371 Date Jan. 13, 1986, § 102(e) Date Jan. 13, 1986, PCT Pub. No. WO85/05517, PCT Pub. Date Dec. 5, 1985

PCT Filed May 11, 1985, Ser. No. 823,494

Claims priority, application Japan, May 11, 1984, 59-94182

Int. Cl.⁴ H04B *14/04*

U.S. Cl. 375—25 **4 Claims**



1. An apparatus for transmitting a digital signal comprising:

means for receiving an input digital signal including digital words each representing a sample value;

means for outputting at least one straight pulse code modulated data word of a first mode and a differential pulse code modulated data word of a second mode, each of said differential data words being produced from two or more of said straight data words;

means for obtaining absolute values of the words of said first and second modes and for detecting respective words having maximum absolute values in the respective modes;

means for multiplying at least one of said maximum absolute

values by a predetermined scale factor coefficient so that the weight coefficient associated with said maximum absolute value in said first mode is less than that associated with said maximum absolute value in said second mode to produce multiplied maximum absolute values;

means for comparing said multiplied maximum absolute values with one another;

mode selecting means for selecting one of said modes having the lesser of said multiplied maximum absolute values; and

transmitting means for transmitting a digital signal including words of the selected mode.

4,685,116

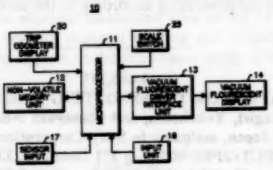
INCREMENTAL COUNT DISPLAY SYSTEM

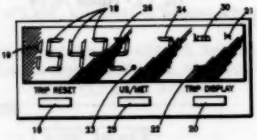
Burton B. Toumayan, Chicago, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 667,243, Nov. 1, 1984. This application Jul. 21, 1986, Ser. No. 888,629

Int. Cl.[4] G06M *3/06*; G06F *11/32*

U.S. Cl. 377—51 **13 Claims**





1. A method of providing a display of a count of incrementally increasing data, comprising the following steps:

(a) providing a display having a plurality of numerical digital representations for displaying said count, said display having a capacity limit as to the largest numerical digital representation that can be displayed thereon;

(b) providing non-permanent overflow indicia means for signalling that said count has exceeded said display's capacity limit;

(c) incrementally increasing said count in response to said incrementally increasing data;

(d) comparing said incrementally increased count with a preselected number;

(e) when said incrementally increased count is less than said preselected number, do not activate said overflow indicia means such that said overflow indicia means is deactivated following previous activation, accidental or otherwise and repeat from step c;

(f) when said incrementally increased count is not less than said preselected number, activate said overflow indicia means and repeat from step c.

4,685,117

BASE CLIPPING PROCESS FOR A SOLID STATE PHOTOSENSITIVE DEVICE

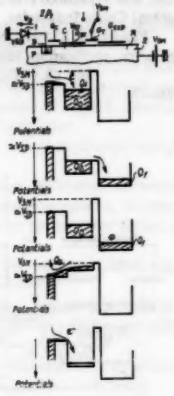
Marc Arques, Grenoble, France, assignor to Thomson-CSF, Paris, France

Filed Dec. 21, 1984, Ser. No. 684,470

Claims priority, application France, Dec. 27, 1983, 83 20846

Int. Cl.[4] H03K *23/46*

U.S. Cl. 377—60 **4 Claims**



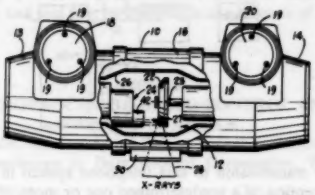
1. In the method of operating photodetecting apparatus which comprises an array of photodetectors which are on a first substrate portion and whose outputs are to be supplied to a shift register by way of separate transition zones which are on a second substrate portion and each of which includes an input MOS transistor formed by a readout diode, a control gate overlying a portion of the second substrate portion, and a charge storage capacitor electrode overlying a charge storage region of the second substrate portion, and a shift register transfer gate, the process of transferring the signal picked up by each photodetector to the shift register to reduce the transfer of background charge comprising the steps of initially biasing at the start of each operating cycle the second substrate portion negatively with respect to the first substrate portion, collecting and integrating signal charge from the photodetector in the charge storage region by way of the readout diode while maintaining the potential of shift register transfer gate low for blocking transfer to shift register, next increasing the potential of the shift register transfer gate for transferring part of the charge in the charge storage region to the shift register, while leaving a remainder portion, next reducing the potential on the shift register transfer gate to be less than the potential of the first substrate portion, and then biasing the potential of the charge storage capacitor electrode so that the potential under said charge storage capacitor is between the bias on the first substrate and the bias on the shift register transfer gate whereby the remainder portion of charge in the charge storage region is essentially returned to the photodector by way of the readout diode.

4,685,118

X-RAY TUBE ELECTRON BEAM SWITCHING AND BIASING METHOD AND APPARATUS

Avery D. Furbee, Elmhurst; Viktor W. Piell, Wheaton, and James E. Burke, Villa Park, all of Ill., assignors to Picker International, Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 550,755, Nov. 10, 1983, abandoned. This application Jul. 3, 1985, Ser. No. 752,311
Int. Cl.[4] H05G 1/56; H01J 35/14
U.S. Cl. 378—114 28 Claims



1. X-ray producing apparatus comprising: an X-ray tube including

(i) a tube cathode having at least one cathode filament which is energized to thermionically emit electrons;

(ii) a tube anode which is a target for electrons thermionically emitted from said cathode;

a housing for mounting said X-ray tube, said housing having a window portion to transmit X-rays generated by said tube;

means for coupling said cathode and anode to a source including a high voltage source outside said housing, said source for maintaining said cathode and anode at different electric potentials so that electrons from said filament accelerate to a focal spot on said anode;

high voltage focus control means comprising a light sensitive switch mounted inside said housing for adjusting the size and shape of said focal spot; and

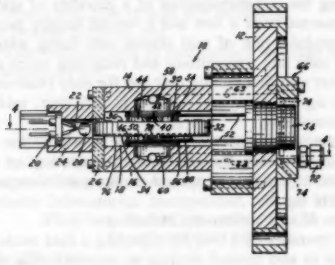
transmission means interposed between said high voltage source and said focus control means including a light pipe defining an optical path for directing open loop control signals to said focus control means from a controller outside said housing.

4,685,119

MOVABLE ANODE X-RAY SOURCE WITH ENHANCED ANODE COOLING

Charles R. Bird, Ypsilanti, and Paul D. Rockett, Ann Arbor, both of Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Apr. 8, 1985, Ser. No. 720,877
Int. Cl.[4] H01J 35/10
U.S. Cl. 378—130 12 Claims



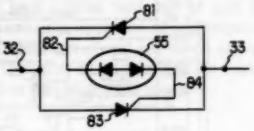
7. An x-ray source comprising: a cathode for selective emission of electrons; a disc-shaped anode having a radially facing peripheral surface opposed to said cathode at constant radius from a central disc axis and a pair of flat axially facing opposed side faces perpendicular to said axis, at least said peripheral surface being constructed to emit x-rays when bombarded by electrons from said cathode; means mounting said anode for rotation about said axis; and means for cooling said anode comprising heat sink means positioned on opposite axial sides of said anode in spaced opposition to said side faces, expansible means sealingly affixed to respective said heat sink means to form chambers on sides of said heat sink means remote from said anode side faces, and means for circulating a heat transport fluid under pressure through both of said chambers so as to expand said expansible means and bring said heat sink means into opposed facing heat-transfer contact with said anode side faces.

4,685,120

ELECTRONIC TRIGGER SWITCH FOR MAINTENANCE TERMINATION UNIT

Richard G. Norris, Arlington; Monty F. Webb, Richardson, and Vinh Q. Le, Arlington, all of Tex., assignors to Teccor Electronics, Inc., Irving, Tex.

Filed Nov. 26, 1985, Ser. No. 801,758
Int. Cl.[4] H04B 3/46
U.S. Cl. 379—26 7 Claims



4. A maintenance termination unit for connecting a telephone line to a telephone subscriber's telephone set, comprising:

a bidirection electronic switch having a conductive state a nonconductive state, said bidirection electronic switch being two nonsensitive silicon controlled rectifiers connected in inverse parallel relationship, wherein the gates of said rectifiers are connected to opposite ends of a two-terminal, bidirectional, diffused PNPN semiconductor device;

said switch turning from said nonconductive state to said conductive state at a voltage level of about 16 volts to about 19 volts; and

said switch remaining in said conductive state as long as the current flow through said switch exceeds a holding current of about 1 milliamperes to about 25 milliamperes.

4,685,121

CONNECTING AND COMMUNICATION SYSTEM AND MEANS FOR A TELEPHONE STATION WITH PERIPHERAL APPARATUS

Jean-Francois Sanglier, Flers, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 1, 1985, Ser. No. 697,353
Claims priority, application France, Feb. 1, 1984, 84 01554
Int. Cl.[4] H04M 11/00
U.S. Cl. 379—90 10 Claims

1. A peripheral telephone system comprising a telephone station for connection to a subscriber line loop, at least one peripheral apparatus, and means connecting said telephone station and said peripheral apparatus for transmitting signals respectively corresponding to respective functional operating conditions of the system, said connecting means being in the form of a bus comprising a plurality of conductors respectively corresponding to respective functional operating conditions of the system and each of such functional operating conditions being signified by signals transmitted only over the particular

one of said condutors corresponding thereto; characterized in that: said telephone station comprises

a device for connecting said telephone station to the telephone line loop,

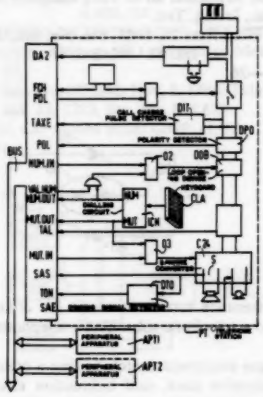
a call detector for generating a call detection signal when a call comes in from said telephone line loop,

a two-state energizing arrangement, having an active state and an inactive state,

a two-state internal control device for controlling said energizing arrangement, said control device having an off-hook state for causing said energizing device to assume its active state and an on-hook state for causing said energizing device to assume its inactive state,

a current regulating arrangement for regulating the current circulating in said telephone line loop when the energizing arrangement is in the active state.

and a 2-wire/4-wire converter which, when the input thereof is activated by a microprocessor, sends an audio signal over said telephone line loop, and the output of



which energizes an earphone or loudspeaker in response to an audio signal received from said telephone line loop;

and said bus comprises at least six conductors

a first conductor for transmitting a reference signal which is common to all peripheral apparatuses connected to said bus,

a second condutor for transmitting from the telephone station a signal indicating the state, either off-hook or on-hook, of said two-state internal control device,

a third conductor for transmitting from the telephone station to said peripheral apparatus an audio signal coming from said telephone line loop,

a fourth conductor for transmitting said call detection signal from the telepone station to said peripheral apparatus,

a fifth conductor for transmitting to said telephone station an external line seizure control signal received from said peripheral apparatus

and a sixth conductor for transmitting to said telephone station an analog input signal received from said peripheral apparatus.

4,685,122

INTERFACE CIRCUIT FOR REMOTE CONTROL OF A PABX

Daniel A. Deveson, Nepean, and Anthony J. Bawcutt, Ottawa, both of Canada, assignors to Mitel Corporation, Canada

Filed Jan. 14, 1985, Ser. No. 691,421

Claims priority, application Canada, May 4, 1984, 453611

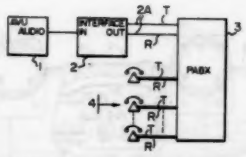
Int. Cl.[4] H04M *11/00, 3/42*

U.S. Cl. 379—90 **31 Claims**

1. In an interactive audio/visual demonstration system for giving an audio/visual demonstration of telephone system special features, an interface circuit comprising:

(a) means for transmitting audio signals received from an audio/visual unit to a telephone system, and

(b) control means, connected to said means for transmitting audio signals and said telephone system, for receiving said audio signals and generating one or more control signals



for transmission to said telephone system in response to reception of a predetermined one or more of said

whereby the telephone system implements one or more of said special features in response to receiving said one or more control signals, simultaneously with the audio/visual system giving said audio/visual demonstration of said special features.

4,685,123

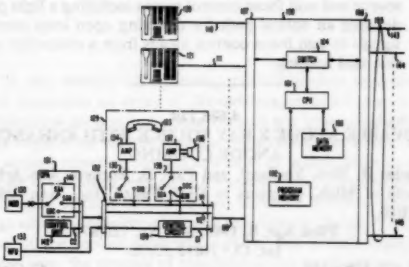
COMMUNICATION SYSTEM HAVING VOICE AND DATA CAPABILITY

Richard Y. Hsia, Holmdel, and Thomas C. Liu, Atlantic Highlands, both of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Filed Sep. 13, 1985, Ser. No. 775,742

Int. Cl.[4] H04M *11/00*

U.S. Cl. 379—93 **9 Claims**



1. A communication system comprising a control module for controlling the communications of a plurality of station sets each connected over a first and a second facility pair to said control module, one of said station sets being adapted for initiating calls and transmitting and receiving voice and data signals over said first facility pair and for only receiving voice and data signals over said second facility pair, said system further comprising

adapter means connected to said one of said station sets and including means for switchably connecting an external device to said first or second facility pair in response to a control signal;

said one of said station sets including

means operably by a user for signaling a data mode request signal to said control module to request a data operating mode,

means for displaying a data mode signal received from said control module indicating when said data mode is established; and

means for sending an off-hook signal to said control module indicating a call request; and

said control module including

means responsive to said data mode request signal for establishing said data mode and for sending said data mode signal to said one of said station sets and

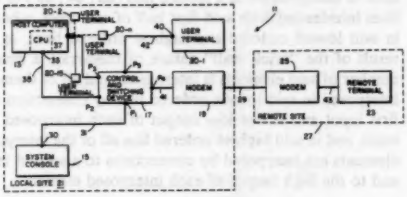
means responsive to said off-hook signal for sending said control signal to said connecting means for establishing a data call connection between said adapter means and said second facility pair during said data mode and for establishing a voice call connection between said adapter means and said first facility pair in the absence of said data mode.

4,685,124

MICROPROCESSOR BASED CONTROL AND SWITCHING DEVICE

Eric L. Smitt, Worcester, and Robert J. Collins, Millis, both of Mass., assignors to Data General Corporation, Westboro, Mass.

Filed Apr. 30, 1985, Ser. No. 728,983
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—95 **19 Claims**



1. A computer network for transmitting and receiving data over a telephone line said computer network comprising:

a. a local site, said local site including:

i. a host computer having a central processing unit (CPU) port and an asynchronous line multiplexer/intelligent asynchronous line multiplexer (ALM/IAC) port,

ii. a system console,

iii. a user terminal,

iv. a modem coupled to said telephone line, and

v. a control and switching device coupled to said CPU port, said ALM/IAC port, said modem, said system console and said user terminal for controlling the flow of data between said host computer, said user terminal, said system console and said modem, said control and switching device having a powered off position and a powered on position, neither said system console, said user terminal nor said remote terminal having access to said host computer when said control and switching device is in said powered off position,

b. a remote site, said remote site including:

i. a remote terminal, and

ii. a modem coupled to said remote terminal and to said telephone line.

4,685,125

COMPUTER SYSTEM WITH TASKING

Derek A. Zave, Sea Bright, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

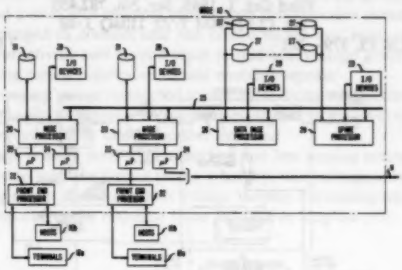
Filed Jun. 28, 1982, Ser. No. 393,123
Int. Cl.[4] G06F *9/00*
U.S. Cl. 379—96 **9 Claims**

1. In a packet switching or data communication or processing system in which images are executed in respective associated computer processes, said system comprising

means within each process for creating a plurality of tasks, at least ones of said tasks being adapted to provide services to the associated image,

dispatcher means operative for passing program control among ones of said tasks which are runnable,

a plurality of routines each of whose execution causes at least one of said tasks to be made runnable, and



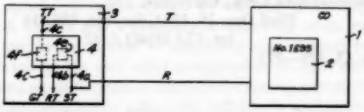
means operative in response to the calling of an individual one of said routines by said associated image for vesting program control in another one of said tasks prior to the execution of said routine, said one of said tasks being adapted to invoke the operation of said dispatcher means at the end of execution of said individual one of said routines and to thereafter at least initiate the vesting of program control in said associated image.

4,685,126

TELEPHONE PAY STATION AND CIRCUIT THEREFOR

Jerome Silverbush, Massapequa, N.Y., assignor to New York Telephone Company, New York, N.Y.

Filed Dec. 27, 1985, Ser. No. 814,217
Int. Cl.[4] H04M *17/00*
U.S. Cl. 379—146 **19 Claims**



1. A telephone pay station of a type in which a predetermined amount of money or coinage is deposited for initiating and paying for a telephone call and the pay station is adapted to be connected via tip and ring lines to a central office containing an electronic switching system which is programmed to provide an initial calling period for the predetermined amount of money or coinage and which, prior to the end of the initial calling period, transmits over the tip line a coin collect signal for instructing the pay station to collect the deposited money or coinage, the telephone pay station comprising:

a first terminal for connecting said pay station to said tip line;

a second terminal for connecting said pay station to said ring line;

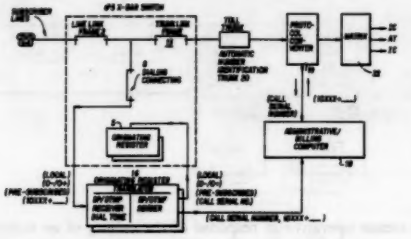
and disconnect circuit means connected to said first and second terminals and adapted to be responsive to said coin collect signal for disconnecting said second terminal from said ring line for a preselected amount of time sufficient to indicate an on-hook condition to said central office.

4,685,127

SYSTEM FOR CONVERTING A NO. 5 CROSSBAR TELEPHONE SWITCHING CENTRAL OFFICE TO A CONFORMING EQUAL ACCESS CENTRAL OFFICE

Arthur O. Miller, Little Rock; Hollis Coleman, Forrest City, both of Ark.; Roger Atkinson, Huntsville, Ala., and Boyd Dorsey, Mabelvale, Ark., assignors to Southwestern Bell Telephone, St. Louis, Mo.

Filed Oct. 1, 1985, Ser. No. 782,455
Int. Cl.[4] H04M *7/12*; H04Q *3/48*
U.S. Cl. 379—221 7 Claims



1. A method for providing equal access to long distance telephone carriers to local telephone company customers who are served by central offices having No. 5 crossbar switching machines without affecting the functioning of said No. 5 crossbar switching machine comprising:

a. intercepting the call while it is within the switching machine and determining the calling number and the called number;

b. transmitting said data to a device for determining the selected long distance carrier;

c. transmitting the identity of the selected long distance carrier to the switch;

d. routing said call to a converter which provides the long distance carrier with call identifying information; and

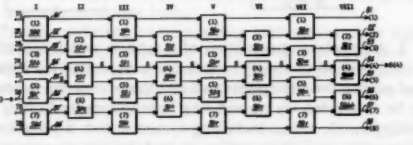
e. routing said call to the selected long distance carrier.

4,685,128

METHOD AND NETWORK FOR TRANSMITTING ADDRESSED SIGNAL SAMPLES FROM ANY NETWORK INPUT TO AN ADDRESSED NETWORK OUTPUT

Jon N. Powell, Lewisville, Tex., assignor to Thomson Components-Mostek Corp., Carrollton, Tex.

Filed Dec. 24, 1984, Ser. No. 686,314
Int. Cl.[4] H04Q *3/42*
U.S. Cl. 379—272 7 Claims



4. Apparatus for uniquely routing signals from a plurality of unordered inputs (71–78) to a particular one of a plurality of ordered outputs (81–88) on the basis of the values of addresses respectively characteristic of signals respectively impressed upon said inputs (71–78), said outputs being ordered in accordance with respective associated values each corresponding to an address value in a range of address values, comprising:

a plurality of circuit elements interconnected in a "brick wall" array, each circuit element having two inputs (A,B), a low output (L), a high output (H) and means for providing an internal address (n) in the form of a predetermined stored value for the element and constituted so that when two address-bearing signals are impressed respectively upon the two inputs (A,B) the signal having the greater address values is throughput to the high output (H) and the signal having the lesser address value is throughput to the low output (L), of said element, and when only one address-bearing signal is presented to the circuit element at an input (A,B), it is throughput to the low output (L) if its address is less than or equal to the predetermined internal address value (n) and is throughput to the high output (H) if its address value is greater than said predetermined internal address (n), and when no address bearing signal is presented to the circuit element both outputs are put in a condition (N) corresponding to absence of signal,

said signal elements being interconnected in said "brick wall" array by ordered signal lines (81'–88') leading respectively to said ordered outputs and into which said circuit elements are interposed in such a manner that except for the lowest and highest ordered lines of said ordered lines, the interposition of said circuit elements in each of said lines is, for successive elements interposed in the same line, alternately between a first input and a low output of an element and between a second input and a high outut of the next element, beginning with the first-mentioned kind of interposition in a first half (83', 85', 87') of said lines and beginning with the second-mentioned kind of interposition in a second half (82', 84', 86') of said lines interleaved with said first half of said ones, whereas in said lowest ordered and highest ordered lines, as the result of the "brick wall" nature of the array, a smaller number of said elements is interposed, and all of them are interposed in said lowest ordered line by connection to a first input and to the low output of each interposed element, and in said highest ordered line all of the interposed elements are interposed by connections to a second input and to the high output of each interposed element.

4,685,129

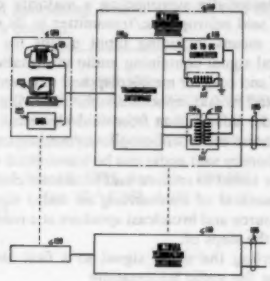
POWER TRANSMISSION ARRANGEMENT FOR TELECOMMUNICATIONS SYSTEMS

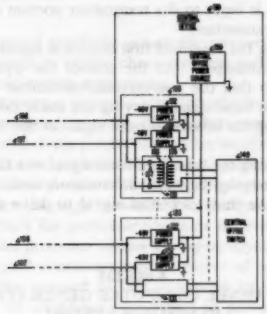
Charles D. Gavrilovich, Naperville, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 2, 1985, Ser. No. 783,129
Int. Cl.[4] H04M *19/06*
U.S. Cl. 379—324 8 Claims

7. An arrangement for supplying electrical power from a central office to a remote customer interface unit connected to the central office by a pair of transmission wires terminating in a transformer at the central office and at the interface unit for the transmission of digital pulses between the central office and the remote interface unit, the power supplying arrangement comprising a pair of power sources at the central office, each power source having an output terminal connected to one of said transmission wires and a ground terminal connected to earth ground for separately supplying power to each wire of said pair of wires, the interface unit having at least one electrical circuit having an input terminal and having a ground terminal connected to earth ground, said transformer terminating said transmission wires at the interface unit comprising a center tapped coil having end terminals connected to said pair of wires and a center terminal connected to said input terminal of said at least one electrical circuit, whereby electrical power is

transmitted from said central office to said interface unit in parallel over said pair of transmission wires and a return path





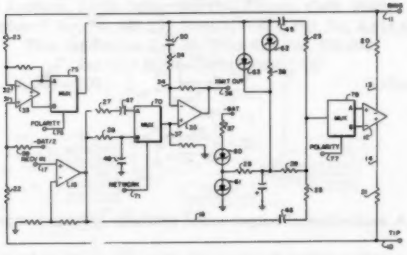
between said power sources and said electrical circuit is provided by earth ground.

4,685,130

SUBSCRIBER LINE CIRCUIT HAVING AN IMPROVED LOOP CURRENT SUPPLY CIRCUIT

Robert V. Burns, Phoenix, Ariz., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Aug. 29, 1985, Ser. No. 770,466
Int. Cl.[4] H04M *19/00*
U.S. Cl. 379—413 **7 Claims**



7. In a subscriber line circuit having a tip conductor and a ring conductor connected to a subscriber loop circuit, an improved loop current supply circuit comprising:

bias voltage means for providing a source of bias voltage;

line circuit means having a first and a second input, and said line circuit means connected to said subscriber loop circuit through said tip and ring conductors, said line circuit means arranged to supply loop current to said subscriber loop;

first selection means including an input connected to said bias voltage generating means and first and second outputs connected to said line circuit means first and second inputs respectively, said first selection means further including an enabling lead connected to common control equipment and a source of enabling signals, said first selection means arranged to connect said line circuit means first input or alternatively said second input to said bias voltage generating means responsive to said enabling signals;

line sensing means connected to said tip and ring conductors arranged to output a voltage representative of the level of loop current in said subscriber line; and

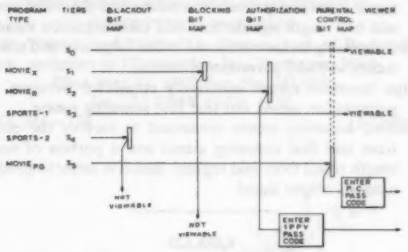
voltage sensing means connected to said line sensing means and to said line circuit means whereby, said voltage sensing means shunts said bias voltage thereby decreasing said loop current in response to an increase in loop current.

4,685,131

PROGRAM BLOCKING METHOD FOR USE IN DIRECT BROADCAST SATELLITE SYSTEM

Donald R. Horne, Don Mills, Canada, assignor to General Instrument Corp., New York, N.Y.

Filed Mar. 11, 1985, Ser. No. 710,466
Int. Cl.[4] H04N *7/167, 7/10, 1/00*
U.S. Cl. 380—20 **13 Claims**

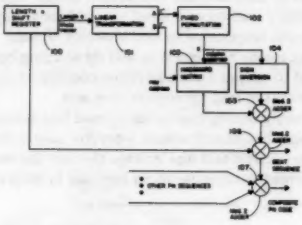


1. A method for preventing the display of selected programs by particular receiving units for use in an impulse pay-per-view television signal distribution system of the type comprising a transmission station and a plurality of receiving units, each receiving unit being capable of displaying one or more programs selected by the user upon manipulation of input means and including an authorization memory containing information as to programs previously authorized for display and a blocking memory containing previously provided information as to programs to be blocked from display, the method comprising the steps of: generating a broadcast signal including a plurality of programs and a program designation associated with each of the programs, the receiving unit receiving the broadcast signal and, upon manipulation by the user of the input means to select a program for display, accessing the blocking memory and comparing the designation associated with the selected program with the contents thereof to determine if the selected program is to be blocked from display, preventing the display of the selected program if the program is to be blocked from display; if the selected program is not to be blocked, accessing the authorization memory and comparing the designation associated with the selected program with the contents of the authorization memory to determine whether the selected program has been previously authorized for display, and preventing the display thereof if the selected program is not previously authorized for display; and, if not previously authorized for display, displaying the selected program if it is not to be blocked, upon further manipulation of the input means.

4,685,132
BENT SEQUENCE CODE GENERATOR

F. Avery Bishop, Salt Lake City, Utah, and Steven L. Bennett, Seattle, Wash., assignors to Sperry Corporation, Blue Bell, Pa.

Filed Jul. 30, 1985, Ser. No. 760,641
Int. Cl.[4] H04L 9/04; H03K 3/84
U.S. Cl. 380—46 24 Claims

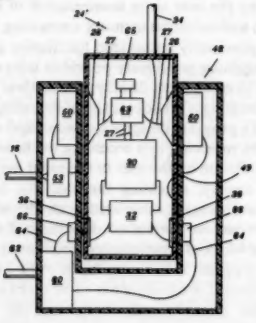


1. A code generator comprising,
register means for supplying an n length signal,
transformation means for receiving said n length signal and transforming same into two n/2 length signals,
permutation means for receiving one of said n/2 length signals and permuting same into a permutted signal,
storage means for storing signals,
said storage means connected to receive said permutted signal from said permutation means and the other one of said n/2 length signals from said transformation means,
first summing means connected to the outputs of said storage means and said permutation means,
sign inversion means selectively connected between said permutation means and said first summing means,
second summing means connected to receive the output from said first summing means and a portion of said n length signal from said register means in order to produce a coded output signal.

4,685,133
WIRELESS AUDIO TRANSMISSION SYSTEM

Jerry R. Iggulden, Valancia, Calif., assignor to INR Technologies, Inc., Northridge, Calif.

Filed Sep. 16, 1985, Ser. No. 776,611
Int. Cl.[4] H04H 5/00; H04B 3/00
U.S. Cl. 381—3 17 Claims



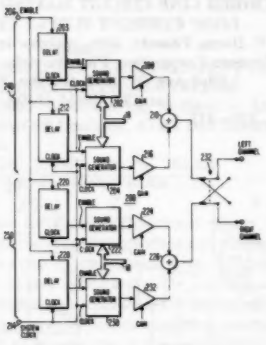
1. A wireless audio transmission system comprising:
(a) a portable, hand-held microphone/transmitter for transmitting audio received by a microphone portion thereof as broadcast electrical signals, said microphone/transmitter having a case with at least one microphone inside connected to said microphone portion and disposed adjacent a sidewall thereof; and,
(b) nesting means having a nest area therein for receiving and substantially surrounding a majority of the surface area of said microphone/transmitter in its said case; said nesting means including input means for receiving an electrical signal containing audio information at an input thereof and coupler means disposed adjacent said nest and connected to said input means for receiving and coupling said audio information from said electrical signal to said microphone of said microphone/transmitter at said sidewall whereby said audio can be transmitted wirelessly to a receiver tuned to receive said broadcast electrical signals.

16. The method of transmitting an audio signal wirelessly between a source and broadcast speakers at a removed location comprising the steps of:
(a) converting the audio signal to a first electrical signal carrying the audio information;
(b) amplifying said first electrical signal;
(c) disposing an induction coil adjacent the coil of a dynamic microphone of a microphone/transmitter;
(d) attenuating the signal out of the dynamic microphone before it is input to the transmitter portion of the microphone/transmitter;
(e) inducing the amplified first electrical signal carrying the audio information into the coil of the dynamic microphone so that the microphone/transmitter broadcasts a broadcast band signal carrying the audio information;
(f) receiving the broadcast band signal at the removed location;
(g) converting the broadcast band signal to a third electrical signal carrying the audio information; and,
(h) using the third electrical signal to drive the broadcast speakers.

4,685,134
MULTICHANNEL COMPUTER GENERATED SOUND SYNTHESIS SYSTEM

Charles M. Wine, Mercer County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Jul. 19, 1985, Ser. No. 756,836
Int. Cl.[4] H04R 5/00; H04B 3/00
U.S. Cl. 381—17 17 Claims



1. A multi-channel output sound synthesis system, comprising:
an enable terminal for the application of a signal indicating when the sound synthesis is to occur;
first and second means for generating first and second audio signals respectively, each generating means having a first input terminal for receiving a signal indicating when the sound generation is to occur and an output terminal;
means for coupling the first input terminal of said first generating means to said enable terminal; and

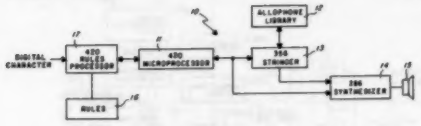
delay means coupled to said enable terminal for delaying the signal indicating when sound synthesis is to occur, the delayed signal being coupled to the first input terminal of said second generating means, wherein said delay means comprises a counter.

4,685,135

TEXT-TO-SPEECH SYNTHESIS SYSTEM

Kun-Shan Lin; Kathleen M. Goudie, and Gene A. Frantz, all of Lubbock, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 5, 1981, Ser. No. 240,694
Int. Cl.[4] G10L *5/00*
U.S. Cl. 381—52 **27 Claims**



1. A test-to-speed synthesis system for converting printed data as represented by digital characters into audible synthesized speech, said system comprising:

allophone rule means having a plurality of allophonic code signals corresponding to the digital characters which are representative of the printed data, wherein the allophonic code signals are determinative of the respective allophone subset variants of each of the recognized phonemes in a given spoken language as modified by the speech environment in which the particular phoneme occurs;

allophone rules processor means having an input for receiving the digital characters representative of printed data and operably coupled to said allophone rule means for searching the allophone rule means to provide an allophonic code signal output corresponding to the digital characters received by sid allophone rules processor means from the allophonic code signals of said allophone rule means; and

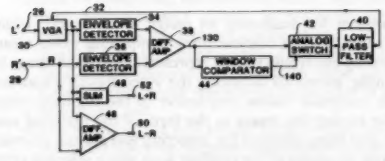
synthesized speech producing means operably coupled to said allophone rules processor means for receiving said allophonic code signal output therefrom to produce an audible synthesized speech-like sound in response to said allophonic code signal output from said allophone rules processor means.

4,685,136

TRIPHONIC SOUND SYSTEM

Don Latshaw, 1 Alta Mira, San Luis Obispo, Calif. 93401

Division of Ser. No. 685,295, Dec. 24, 1984, Pat. No. 4,615,043.
This application Jul. 28, 1986, Ser. No. 890,092
Int. Cl.[4] H03G *3/00*; H04R *5/00*
U.S. Cl. 381—108 **3 Claims**



1. Apparatus for automatically equalizing a first signal and a second signal, comprising in combination:

variable gain amplifier means for producing in response to the first signal an amplified first signal;

first envelope detector means connected to said variable gain amplifier means and responsive to the amplified first signal to produce an envelope detected first signal;

second envelope detector means for producing in response to the second signal an envelope detected second signal;

differential amplifier means connected to said first envelope detector means and connected to said second envelope detector means, for producing an error signal in response to the envelope detected first signal and the envelope detected second signal;

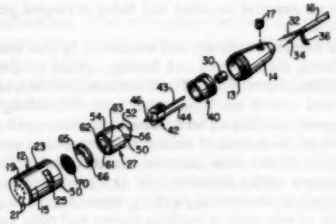
feedback loop means connected to said differential amplifier means for receiving the error signal and for producing in response to the error signal a gain signal, and connected to said variable gain amplifier means for applying to it the gain signal, the gain signal increasing the gain of said variable gain amplifier means when the envelope detected first signal is less than the envelope detected second signal, and decreasing the gain of said variable gain amplifier means when the envelope detected first signal is greater than the envelope detected second signal, said feedback loop means further comprising low pass filter means connected to said differential amplifier means for receiving the error signal, responsive to the error signal to produce a filtered error signal, and connected to said variable gain amplifier means for applying to it as the gain signal the filtered error signal.

4,685,137

MICROPHONE WITH NON-SYMMETRICAL DIRECTIVITY PATTERN

Alan R. Watson, and Michael A. Bryson, both of Buchanan, Mich., assignors to Electrovoice, Inc., Buchanan, Mich.

Filed May 17, 1985, Ser. No. 735,400
Int. Cl.[4] H04R *19/04, 1/20*
U.S. Cl. 381—174 **11 Claims**



1. A microphone comprising:

a diaphragm for sensing sound pressure waves, said diaphragm having a front side and a rear side;

means for sensing forward and rearward movement of said diaphragm, said movement sensing means including an electrically conductive element mounted in spaced relationship to the rear side of said diaphragm so as to define therebetween a cavity;

a damping plug member for positioning said movement sensing means in said spaced relationship, said damping plug member substantially enclosing said cavity; and

a diaphragm mounting member attached to said diaphragm, said damping plug member being in pressing contact with diaphragm mounting member, said damping plug member further having a non-symmetrical arrangement of at least one aperture for permitting sound pressure waves to enter said substantially enclosed cavity at substantially a peripheral edge of said cavity, said at least one aperture extending between said diaphragm mounting member and said damping plug member.

4,685,138

SYSTEM FOR THE DISPLAY AND SCANNING OF THE CONTENTS OF A COUNTER EQUIPPED WITH COUNTING WHEELS

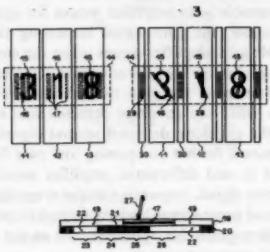
Gregor Antes, Zurich; Mathis Halder, Baar; Paul Fuchs, Küssnacht, and Peter Gehr, Cham, all of Switzerland, assignors to LGZ Landis & Gyr Zug AG, Zug, Switzerland

Filed Oct. 29, 1984, Ser. No. 666,113

Claims priority, application Switzerland, Nov. 3, 1983, 5943/83

Int. Cl.[4] G06K 9/18, 19/00

U.S. Cl. 382—12 8 Claims



1. A system for visually displaying and photoelectrically scanning a counter including counting wheels having respective peripheries, comprising

a plurality of numeral members associated with and located on the respective peripheries of said counting wheels, said numeral members being visible under diffused light;

optical marking means associated with each numeral member and coded for its associated numerical member, each of said optical marking means including an optical surface element at least partially light permeable and comprising retroreflective material, each of said optical surface elements being at least partially superimposed on its associated numeral member and being arranged generally in a row;

said numeral members and associated optical marking means being dimensioned and having optical properties so that illumination of one of said numeral members and its associated optical marking means with diffused light results in good visibility of said numeral members and poor visibility of its associated optical marking means while illumination of the same numeral member and optical marking means with a directed light at a predetermined incidence angle to the optical marking means results in good visibility of said optical marking means and poor visibility of its associated numeral members in the vicinity of said incidence angle;

wherein the optical marking means associated with each numeral member is photoelectrically scannable.

4,685,139

INSPECTING DEVICE FOR PRINT

Toshiro Masuda, Tokyo; Kouichi Ishizuka, Koshigaya; Toshiji Fujita, Niiza, and Yoshio Kinoshita, Mihara, all of Japan, assignors to Toppan Printing Co., Ltd. and Mitsubishi Jukogyo Kabushiki Kaisha, both of, Japan

Filed Mar. 15, 1985, Ser. No. 712,151

Int. Cl.[4] G06H 9/00

U.S. Cl. 382—1 8 Claims

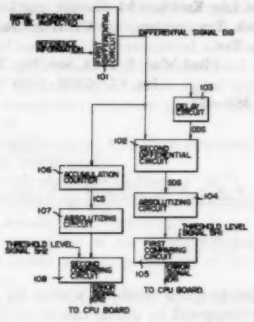
1. An inspecting device for a print for inspecting a printing defect occurred on a print pattern of a printed sheet comprising:

an optical detecting device for detecting image information at every pixel by optically scanning the print pattern of the printed sheet in a direction perpendicularly to the feeding direction of the printed sheet,

reference information storing means for storing the image information at every pixel of the print pattern of the normal printed sheet as reference information,

first differential calculating means for calculating the difference between the detected image information and the reference information;

delay means for delaying the differential signal produced by said first differential means by several pixels in the scanning direction of said optical detecting device;



second differential calculating means for calculating the difference between the differential signal produced by said first differential calculating means and the differential signal delayed and produced by said delay means; and

comparing means for comparing the differential signal produced by said second differential calculating means with a predetermined allowable value to output an error signal for meaning the production of a printing defect on the print pattern when the differential signal exceeds the allowable range.

4,685,140

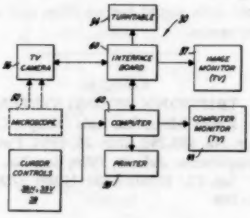
KERATOGRAPH AUTOSCANNER SYSTEM

Houston B. Mount, II, Tulsa, Okla., assignor to Kera Corporation, Santa Clara, Calif.

Filed Jun. 26, 1984, Ser. No. 624,650

Int. Cl.[4] G06K 9/00

U.S. Cl. 382—6 16 Claims



1. A system for analyzing an image of an object which includes superimposed contour lines, comprising video means for generating electronic signals representative of the image by line scanning; means for digitizing the video signals a scan line at a time; computer means responsive to the digitized video signals for storing the image in the form of the digitized scan line data, and being adapted for detecting and storing intersection address locations of the contour lines along selected reference lines; a monitor controlled by the video means and stored addresses for displaying the image and intersection locations; the computer means being further adapted to detect the intersection addresses based upon highest-magnitude peak values of the digitized video signals along the selected reference lines, and to correct intersection addresses by selectively writing in

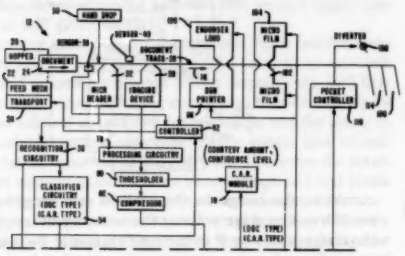
high or low values; and adjustable correction control means interfacing with the computer means for selectively positioning correction cursors on the monitor image to thereby generate the address of the intersection correction.

4,685,141

METHOD AND SYSTEM FOR FINDING IMAGE DATA ASSOCIATED WITH THE MONETARY AMOUNT ON FINANCIAL DOCUMENTS

Zahirul Hoque, and Akihiro Oka, both of Waterloo, Canada, assignors to NCR Canada Ltd - NCR Canada Ltee, Mississauga, Canada

Filed Dec. 19, 1983, Ser. No. 562,785
Int. Cl.[4] G06K 9/00
U.S. Cl. 382—7 **5 Claims**



4. A system comprising:

means for producing image data of at least a portion of a document on which monetary amount data in the form of characters is located, said monetary amount data being preceded on said document by an asterisk or a dollar sign, each of which shall be referred to hereinafter as a clue character;

converting means coupled to said imaging means to convert said image data to a matrix of binary data corresponding to said image data;

means for receiving and also storing said matrix of binary data;

means for withdrawing from said receiving and storing means and from a predetermined side of said matrix of binary data a portion of said binary data corresponding to a character which may be a clue character or a character of said monetary amount data, said portion of said binary data being hereinafter referred to as character data; said character data having machine-readable topographical features which are indicative of the character associated therein; and

means for evaluating said topographical features of said character data to determine whether or not said character data is indicative of a said clue character;

said evaluating means comprising:

means for determining the physical size of said character data;

means for comparing said physical size of said character data with predetermined criteria to determine whether said character data has a physical size which is greater than or smaller than said predetermined criteria; said character data whose physical size is smaller than said predetermined criteria being referred to hereinafter as small character data; and

means for receiving said small character data and for evaluating said machine-readable topographical features of said small character data to determine whether or not said small character data is indicative of an asterisk;

said means for receiving said small character data and for evaluating said machine-readable topographical features of said small character data also including means for locating a hole in the center of said small character data;

said character data whose physical size is greater than said predetermined criteria from said comparing means being referred to hereinafter as large character data;

said evaluating means further comprising;

means for receiving said large character data;

means coupled to said receiving means for determining the height and width of said large character data;

means for comparing said height and width of said large character data to select said large character data which has a width-to-height ratio of less than one; and

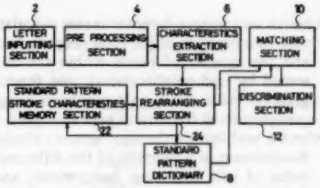
second evaluating means for evaluating the machine-readable topographical features of said large character data having a width-to-height ratio of less than one to determine whether or not said last-named character data is indicative of a dollar sign.

4,685,142

METHOD AND DEVICE FOR HANDWRITTEN LETTER RECOGNITION

Katsunori Ooi, Yokohama; Yutaka Hidai, Kodaira; Yoshiaki Kurosawa, Yokohama, and Yoshikatsu Nakamura, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 10, 1985, Ser. No. 721,906
Claims priority, application Japan, Apr. 12, 1984, 59-73422
Int. Cl.[4] G06K 9/64
U.S. Cl. 382—13 **7 Claims**



1. A handwritten letter recognition method for recognizing a handwritten letter which is inputted by writing, comprising the steps of:

(a) storing stroke information and stroke order information of a candidate letter pattern;

(b) detecting stroke information of a written letter;

(c) reading the stroke information and stroke order information of the candidate letter pattern, and detecting in turn the stroke information of the written letter which corresponds to the stroke information of the candidate letter pattern;

(d) rearranging the stroke information of the written letter to be in an order which corresponds to the stroke information order of the candidate letter pattern; and

(e) processing the written letter information to identify the written letter by comparing the stroke information of the written letter to stroke information of letters having said candidate letters pattern in the order indicated by said stroke information order.

4,685,143

METHOD AND APPARATUS FOR DETECTING EDGE SPECTRAL FEATURES

William C. Choate, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 21, 1985, Ser. No. 714,659
Int. Cl.[4] G06K 9/52, 9/62
U.S. Cl. 382—25 **24 Claims**

8. In an apparatus for the automatic recognition of images wherein edge maps are analyzed for the occurrence of edge reversal features, the improvement comprising:

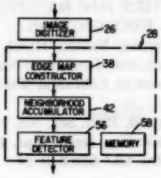
means for storing a number of edges contained within a

neighborhood of image pixels as corresponding edge vectors having magnitude and direction;

means for accumulating a plurality of said edge vectors into an input edge spectrum for said neighborhood, said spectrum being divided into a plurality of components equal to a number of angular bins, each bin being of equal angular width;

a feature detector means for detecting edge directional reversals within said neighborhood for finding a gap, said gap being a plurality of angularly adjacent components of said spectrum, said adjacent components having a relatively low magnitude with respect to other components of said spectrum angularly bounding said gap;

wherein said feature detector means finds a direction of an adge reversal feature as a function of the average of the angular bin number of each component in said gap as rotated by a number of bins equivalent to 90°;



wherein said feature detector means calculates size discriminant as a function of the total magnitude of said spectrum and the number of pixels within the image area represented by said neighborhood, said function reaching its greatest value when said spectrum magnitude equals a predetermined fraction of said area pixel number;

wherein said feature detector means calculates a symmetry discriminant as a function of the difference of the magnitudes of said bounding components; and wherein said feature detector means derives a nonzero edge reversal feature magnitude as a fuction of the size descriminant and the symmetry discriminant; and

means for using the edge reversal feature magnitude and direction to determine the existence and direction of an edge reversal within said neighborhood.

4,685,144

IMAGE PROCESSING SYSTEM WITH TRANSFORMATION DETECTION

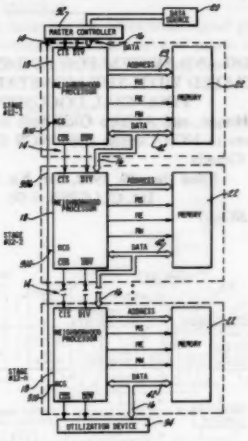
David McCubbrey, and Theron Friedman, both of Ann Arbor, Mich., assignors to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Filed Oct. 29, 1984, Ser. No. 665,667
Int. Cl.[4] G06K *9/00*
U.S. Cl. 382—49 **5 Claims**

1. An image processing system having at least one neighborhood transformation stage in communication with a host computer, said neighborhood transformation stage including neighborhood extraction means for sequentially accessing a group of neighboring pixels in the image, and transformation logic means for either transforming or not transforming a given pixel in the neighborhood into a new value as a function of the values of other pixels in the neighborhood, wherein the improvement comprises:

at least one transformation detection means, each connected to a corresponding neighborhood transformation stage, for providing an output signal indicating whether or not a transformation has occurred for said given pixel in each accessed neighborhood in said corresponding neighborhood transformation stage; and

communication means connected to said at least one transformation detection means for transferring data to the host computer separately from the image pixels, said data being related to the output signals from said transformation detection means whereby image processing time may be decreased by permitting the host computer to determine from said data whether or not a transformation has occurred in the image in the at least one neighborhood transformation stage without the necessity of transferring the image pixels back to the host computer for analyses.

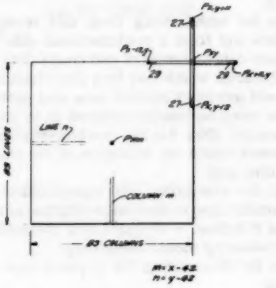


4,685,145

CONVERSION OF AN IMAGE REPRESENTED BY A FIELD OF PIXELS IN A GRAY SCALE TO A FIELD OF PIXELS IN BINARY SCALE

Michael Schiller, Riverdale, N.Y., assignor to Fingermatrix, Inc., North White Plains, N.Y.

Filed Dec. 7, 1984, Ser. No. 679,622
Int. Cl.[4] G06K *9/38*
U.S. Cl. 382—52 **21 Claims**



1. The method of providing a fingerprint image represented by a field of binary pixels comprising the steps of:

a. optically imaging a finger surface or a continuous fingerprint to provide an input gray scale image of said fingerprint, said input image being a field of gray scale pixels,

b. generating a first intermediate binary image using a first elongate mini-field by the method comprising the steps of: for each pixel in said gray scale image, positioning said first elongate mini-field in a predetermined association with said pixel, comparing an average gray scale value of said mini-field with the gray scale value of said pixel, and assigning a binary value to a corresponding pixel of said first intermediate binary image, said binary value being a

function of the relative values of said average gray scale value and said pixel gray scale value,

c. generating a second intermediate binary image using a second elongate mini-field, the elongate axes of said first and second elongate mini-fields being at substantial angles to one another, by the method comprising the steps of: for each pixel in said gray scale image, positioning said second elongate mini-field in a predetermined association with said pixel, comparing an average gray scale value of said mini-field with the gray scale value of said pixel, and assigning a binary value to a corresponding pixel of said second intermediate binary image, said binary value being a function of the relative values of said average gray scale value and said pixel gray scale value,

d. generating a reference intermediate binary image, said reference intermediate binary image having directional acuity in any given locality that is intermediate between the directional acuity of said first and second binary images in said given locality,

e. associating each pixel of each of said three intermediate binary images with a predetermined subfield to establish first and second correlation values respectively, said first correlation value indicating correlation between the pixels in said subfield in said first binary image and the pixels in said subfield in said reference binary image, said second correlation value indicating correlation between the pixels in said subfield in said second binary image and said pixels in said subfield in said reference binary image, and

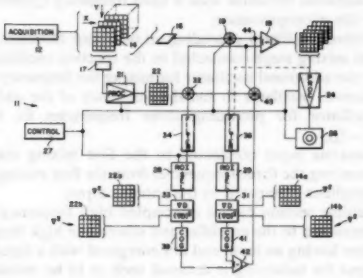
f. assigning a binary value to each pixel in a fourth binary image, said binary value in said fourth image being the binary value for the corresponding pixel from the one of said first or second intermediate binary images whose correlation value indicates the greater correlation.

4,685,146

AUTOMATIC MISREGISTRATION CORRECTION

Paul Fenster, Petach Tikva, and Yair Shimoni, Jerusalem, both of Israel, assignors to Elscint Ltd., Haifa, Israel

Filed May 29, 1984, Ser. No. 614,840
Claims priority, application Israel, Jul. 26, 1983, 69327
Int. Cl.[4] G06K 9/40
U.S. Cl. 382—54 **34 Claims**



1. A method for correcting for artifacts generated by object motion caused misregistration between different images of the same object,

said method comprising of:

obtaining data for first and second images of the same object, which may have normally changing and normally non-changing portions;

selecting a point on a normally non-changing portion;

locating said point in each of said images;

the step of locating the point including the steps of:

directing a Region-of-Interest (ROI) to encompass a normally non-changing portion in each of said first and second images;

determining the density in the ROI in each of said first and second images,

determining the density gradients in the ROI in each of said first and second images,

determining the amplitudes of the density gradients in the ROI in each of said first and second images,

transforming said amplitudes of the density gradients in the ROI in each of said first and second images to quantities that are positive, and

determining as the point in each of said first and second images the centers of gravity (COGs) of said quantities within the ROI in each of said first and second images,

subtracting coordinates of the COG of one of said images from coordinates of the COG of the other of said images to provide the vector extending between the point in each of said first and second images, and

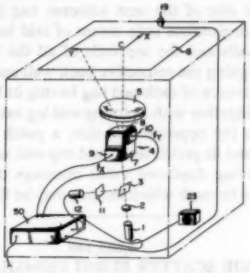
using the vector to move said first and second images relative to each other a distance and direction as determined by said vector.

4,685,147

OPTICAL READING AND DISPLAYING DEVICE

Yoshiaki Honjo, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 10, 1984, Ser. No. 598,888
Claims priority, application Japan, Apr. 15, 1983, 58-65678
Int. Cl.[4] G06K 9/58
U.S. Cl. 382—66 **15 Claims**



1. An optical scanning and display apparatus comprising:

a light source means for generating light;

a deflection means for deflecting said light from said light source means;

a deflection control means for generating electrical signals that control the deflection of light by said deflections means, said deflection control means generating during a first time period a first sequence of electrical signals for optical scanning of an object with said light from said light source means and during a second time period a second sequence of electrical signals for scanning said light from said light source means to produce a readable character display;

a window means for allowing said light deflected by said deflection means to pass therethrough to scan said object to be scanned when said first sequence of electrical signals are supplied to said deflection means from said deflection control means and for allowing the display in readable form of optical characters formed by said light deflected by said deflection means when said second sequence of electrical signals for optical character display are supplied to said deflection means from said deflection control means;

a conversion means for converting into electrical signals light reflected from said object; and

means for receiving said electrical signals from said conversion means and recognizing data recorded on said object

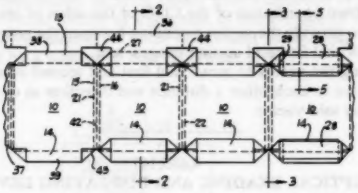
in accordance with said received electrical signals, and wherein said displayed characters are representative of said recognized data.

4,685,148

SQUARE ENDED VALVE BAG

Oliver R. Titchenal, North Ridgeville, Ohio, assignor to Basic Packaging Systems, Inc., Avon Lake, Ohio

Filed Sep. 8, 1986, Ser. No. 904,666
Int. Cl.[4] B65D *30/20, 30/00*
U.S. Cl. 383—37 **12 Claims**



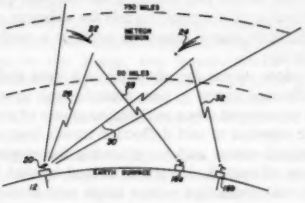
1. In a chain of square ended bags constructed from an elongated band with each of said bags being defined by front and back walls, top and bottom ends, and fore and aft seal sides with each said seal side consisting of portions of said band extending from each said wall and end and sealed together by a side seal, each said seal side being breakably joined to the nearest seal side of the next adjacent bag in the chain, and elongated longitudinal strip means of said band located along the back walls and the top ends of all the bags and at least partially aligning the respective back wall and top end of each bag, the provision of each said bag having its back wall and top end sealed together with a closing seal leg extending from each seal side to the opposite seal side, a patch on said top end affixed around its perimeter to said top end, said patch and said top end having displaced valve openings therein defining a valve means through which the bag may be filled from the top.

4,685,149

METEOR SCATTER BURST COMMUNICATION SYSTEM

Dale K. Smith, Benton; Thomas G. Donich, Federal Way; Bobby V. Dickerson, Maple Valley, and Raymond E. Leader, Seattle, all of Wash., assignors to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 820,206, Jul. 29, 1977, Pat. No. 4,277,845. This application Feb. 20, 1981, Ser. No. 236,353
The portion of the term of this patent subsequent to Jul. 7, 1998, has been disclaimed.
Int. Cl.[4] H04B *1/38*
U.S. Cl. 455—56 **5 Claims**



1. A method of meteor burst radio communication, comprising the steps of:

generating a first polling code which polls a group of remote stations;

transmitting said polling code;

receiving, by means of signals reflected from meteor trails, said transmitted first polling code at a plurality of said remote stations of said group;

transmitting response signals from at least some of said remote stations receiving said transmitted first polling code; and

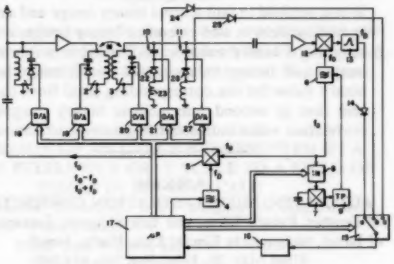
receiving said response signals, selecting a subset of said group of remote stations depending upon which said response signals have been received, namely, said subset including at least one of the remote stations of said group from which a response signal has not been received, and generating for transmission a second polling code, which polls those remote stations in said subset.

4,685,150

TUNING OF A RESONANT CIRCUIT IN A COMMUNICATIONS RECEIVER

Gerhard Maier, Dauchingen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Filed Mar. 12, 1984, Ser. No. 588,892
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1983, 3308690
Int. Cl.[4] H04B *1/16*
U.S. Cl. 455—183 **18 Claims**



10. An electronic tuning resonant circuit of a communications receiver apparatus comprising

a microprocessor for selecting a receiver channel;

an additional oscillator with a fixed frequency f_D connected to the microprocessor;

a receiver oscillator providing an oscillator frequency fo;

a first mixing stage connected to the receiver oscillator and to the additional oscillator for mixing the frequency of the receiver oscillator fo and the frequency of the additional oscillator for providing three frequencies fo, $fo+f_D$, $fo-f_D$;

an antenna input connected to the first mixing stage for receiving the three frequencies from the first mixing stage;

an amplifier connected to the antenna input;

a multiple section circuit of coupled high frequency filters connected to the amplifier and where one high frequency filter having an input and not energized with a signal at its input for balancing is detuned such as to be outside of a frequency range $fo-f_D$;

a second mixing stage connected to the multiple section circuit high frequency filters for generating of an intermediate frequency;

a narrow band filter connected to the second mixing stage and tuned to the frequency of the additional oscillator;

an evaluation circuit connected to the narrow band filter and for interrupting via the microprocessor a further change of the tuning of the high frequency filter to be tuned when a maximum input voltage is reached at the evaluation circuit;

an acceptor circuit connected to the amplifier and tuned to a mirror frequency of a selected channel for receiving an adjustable tuning signal;

a digital-analog converter connected to the microprocessor

for setting a tuning voltage and connected to a high frequency filter where in case of an optimum balancing of the acceptor circuit the tuning voltage is retained for this acceptor circuit and thereby determing tuning values and where the determined tuning values are applied to respective voltage-variable diodes of the high frequency filters whereby the receiver apparatus is tuned by balancing the filter circuits successively based on stepwise changeable tuning voltages; and

a second acceptor circuit for performing the same balancing process relating to an oscillator frequency fo, where during the balancing process the acceptor circuits are switched to a maximum tuning voltage and where after the balancing process the additional oscillator and the first mixing stage are disconnected.

DESIGN PATENTS

GRANTED AUG. 4, 1987

ERRATA

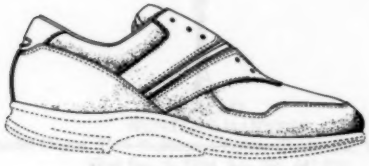
For CLASS	See PATENT NO.
D14-113	291,254

DESIGNS

AUGUST 4, 1987

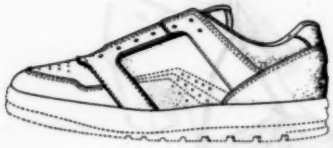
291,140
LEGGING UPPER AND SOLE PERIPHERY THEREFOR
Peder Gjendemsjo, Tomrefjord, Norway, assignor to A/S More Tekstilfabrikk, Gaseid, Norway
Filed Jun. 19, 1984, Ser. No. 622,286
Claims priority, application Norway, Jan. 24, 1984, 64824
Term of patent 14 years
U.S. Cl. D2—267

291,141
SHOE UPPER
James K. Tong, and Brenda Kelley, both of Beaverton, Oreg., assignors to Pensa, Inc., Portland, Oreg.
Filed Aug. 22, 1986, Ser. No. 899,108
Term of patent 14 years
U.S. Cl. D2—314

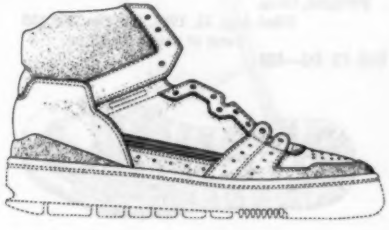


291,142
SHOE UPPER
Brenda Kelley, Beaverton, Oreg., assignor to Pensa, Inc., Portland, Oreg.
Filed Aug. 22, 1986, Ser. No. 899,103
Term of patent 14 years
U.S. Cl. D2—314

291,143
SHOE UPPER
Lawrence Selbiger, Portland, and Brenda Kelley, Beaverton, both of Oreg., assignors to Pensa, Inc., Portland, Oreg.
Filed Aug. 22, 1986, Ser. No. 899,127
Term of patent 14 years
U.S. Cl. D2—314



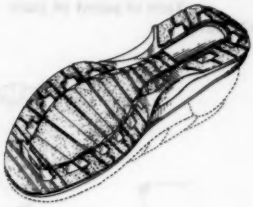
291,144
SHOE UPPER
James K. Tong, Portland, and Bruce MacGregor, Lake Oswego, both of Oreg., assignors to Pensa, Inc., Portland, Oreg.
Filed May 22, 1986, Ser. No. 866,083
Term of patent 14 years
U.S. Cl. D2—314



291,145
FOOTWARE ORNAMENT
Leslie Allen, P.O. Box 656, Eagle, Colo. 81631
Filed Aug. 6, 1984, Ser. No. 637,968
Term of patent 14 years
U.S. Cl. D2—317

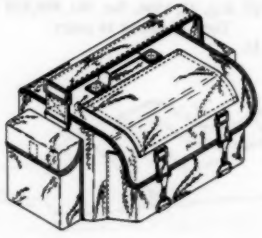
291,146
SHOE SOLE
Lawrence Selbiger, Portland, Oreg., assignor to Pensa, Inc., Portland, Oreg.
Filed Aug. 22, 1986, Ser. No. 899,105
Term of patent 14 years
U.S. Cl. D2—320

291,147
SHOE SOLE
Brenda Kelley, and James K. Tong, both of Beaverton, Oreg., assignors to Pensa, Inc., Portland, Oreg.
Filed Aug. 22, 1986, Ser. No. 899,106
Term of patent 14 years
U.S. Cl. D2—320

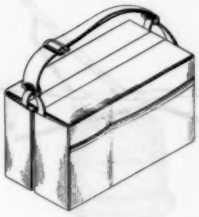


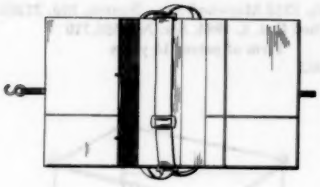
291,148
KNEE PLATFORM CRUTCH
Marco Rizzo, 1150 S. King St., #908, Honolulu, Hi. 96814
Filed Oct. 1, 1984, Ser. No. 656,683
Term of patent 14 years
U.S. Cl. D3—7

291,149
EMERGENCY BAG
J. Rudy Smith, 1239 Ridge Ave., Philadelphia, Pa. 19123
Filed Jan. 24, 1985, Ser. No. 694,512
Term of patent 14 years
U.S. Cl. D3—48



291,150
FOLDABLE TRAVEL BAG
Mark A. Beran, Niwot, Colo., assignor to BC Creations, Inc., Niwot, Colo.
Filed Aug. 27, 1984, Ser. No. 644,509
Term of patent 14 years
U.S. Cl. D3—48



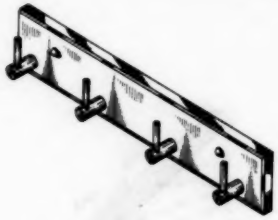


291,151
HUNTER'S HARNESS
Daniel Dugan, 2257 Wellington Green, Clarksville, Ind. 47130
Filed Sep. 6, 1984, Ser. No. 647,830
Term of patent 14 years
U.S. Cl. D3—100

291,152
ROLLER COVER SUPPORT FOR A PAINTING ROLLER
Bengt A. Bay, Slangerup, Denmark, assignor to Bay & Vissing A/S, Denmark
Filed Dec. 10, 1984, Ser. No. 680,077
Claims priority, application Denmark, Jun. 25, 1984, 578/84
Term of patent 14 years
U.S. Cl. D4—122

291,153
COLLAPSIBLE EASEL
Koma Nakatani, Tokyo, Japan, assignor to Velbon International Corporation, Torrance, Calif.
Filed Oct. 5, 1984, Ser. No. 657,935
Term of patent 14 years
U.S. Cl. D6—312

291,154
CAP RACK
Patricia J. Owen, P.O. Box 710, El Dorado, Kans. 67042
Filed Mar. 1, 1985, Ser. No. 707,477
Term of patent 14 years
U.S. Cl. D6—323



291,155
ORTHOPEDIC CHAIR
Roger Wertheimer, 1418 Richmond Ave., Suite 1031, Houston, Tex. 77006
Filed Jan. 30, 1985, Ser. No. 696,396
Term of patent 14 years
U.S. Cl. D6—335

291,156
CONVERTIBLE HIGH CHAIR
Shinroku Nakao, Kanagawa; Yoshiyasu Ishii, and Susumu Matsumoto, both of Tokyo, all of Japan, assignors to Combi Co., Ltd., Tokyo, Japan
Filed Nov. 13, 1984, Ser. No. 670,848
Claims priority, application Japan, May 25, 1984, 59-21329
Term of patent 14 years
U.S. Cl. D6—338

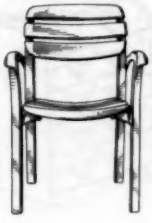
291,157
CHAIR FRAME
Leo Martin, 260 NW. 25th St., Miami, Fla. 33127
Filed Jan. 4, 1985, Ser. No. 688,728
Term of patent 14 years
U.S. Cl. D6—373

291,158
TWO-WAY BINDER RACK
Beverly C. Rich, 1310 Maywood Ave., Ruxton, Md. 21204
Filed Oct. 1, 1984, Ser. No. 656,710
Term of patent 14 years
U.S. Cl. D6—362

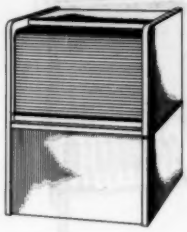
291,159
CHAIR
Mauro Monesi, S. Lazzaro di Savena, Italy, assignor to Castelli S.p.A., Bologna, Italy
Filed Mar. 4, 1985, Ser. No. 707,985
Claims priority, application Italy, Sep. 4, 1984, 53784/84[U]
Term of patent 14 years
U.S. Cl. D6—366

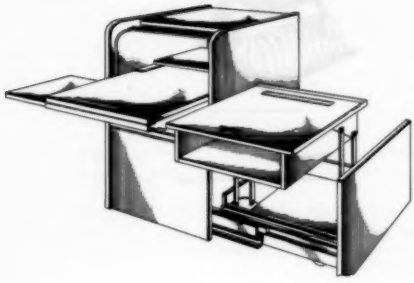
291,160
CHAIR
Thomas S. Biscoe, Columbia, Pa., assignor to Litton Business Systems, Inc., York, Pa.
Filed Apr. 5, 1984, Ser. No. 596,874
Term of patent 14 years
U.S. Cl. D6—366

291,161
STACKABLE ARMCHAIR
Manfred Hubert, Seyssins, France, assignor to Allibert SA, Grenoble, France
Filed Feb. 1, 1985, Ser. No. 697,578
Claims priority, application Hague, Aug. 31, 1984, DM/004144
Term of patent 14 years
U.S. Cl. D6—370

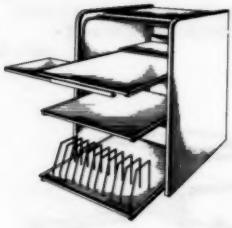


291,162
PERSONAL COMPUTER STORAGE CABINET
Alfred Kwiecinski, Fairfield, Ohio, assignor to Hamilton Sorter Co., Inc., Fairfield, Ohio
Filed Apr. 22, 1985, Ser. No. 726,337
Term of patent 14 years
U.S. Cl. D6—430

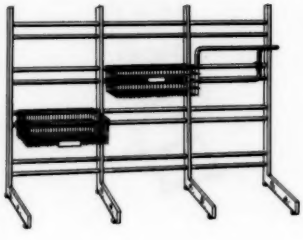




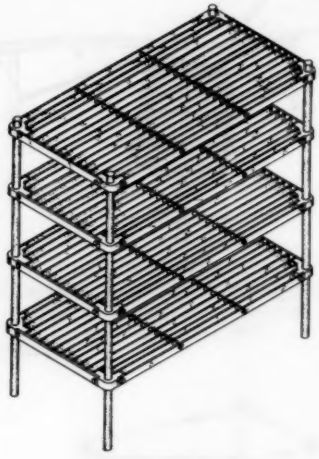
291,163
STORAGE CABINET FOR A PERSONAL COMPUTER
Alfred Kwiecinski, Fairfield, Ohio, assignor to Hamilton Sorter Co., Inc., Fairfield, Ohio
Filed Apr. 22, 1985, Ser. No. 726,338
Term of patent 14 years
U.S. Cl. D6—430



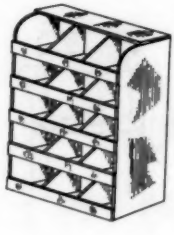
291,164
STORAGE RACK FOR BOOKS, TAPES, RECORDS AND THE LIKE
Harley E. Luyk, Grand Rapids; Robert K. Boardman, Holland, both of Mich.; Jean E. Dahlgren, Dallas, and Christine J. Voigt, Arlington, both of Tex., assignors to The Worden Company, Holland, Mich.
Filed Jul. 2, 1984, Ser. No. 626,687
Term of patent 14 years
U.S. Cl. D6—465



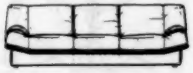
291,165
SHELF UNIT
Leroy Ray, Greene County, Mo., assignor to Storage Unlimited, Inc., Nixa, Mo.
Filed Apr. 29, 1985, Ser. No. 728,613
Term of patent 14 years
U.S. Cl. D6—465



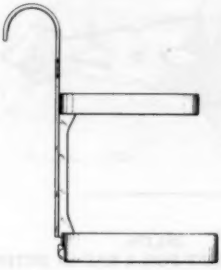
291,166
DISPLAY RACK
Reny G. Morris, Hayward, Calif., assignor to Jeffrey E. Knight, Oakland, Calif., a part interest
Filed Jan. 3, 1984, Ser. No. 567,503
Term of patent 14 years
U.S. Cl. D6—476



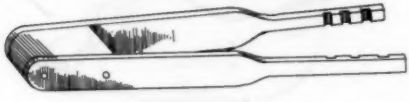
291,167
SEAT
Fulvio Forbicini, Via Provinciale Felisio 1/1, Lugo di Ravenna (Province of Ravenna), Italy
Filed Jun. 19, 1984, Ser. No. 622,305
Claims priority, application Italy, Dec. 23, 1983, 14763/83[U]
Term of patent 14 years
U.S. Cl. D6—381



291,168
COLLAPSIBLE PLASTIC HOLDER FOR A CONTAINER OR THE LIKE
Michael D. Cranford, Jacksonville, Fla., assignor to Ocean Gem, Inc., Gilbert, S.C.
Filed Jul. 20, 1984, Ser. No. 632,861
Term of patent 14 years
U.S. Cl. D7—70



291,169
TONGS
Howard Foulds, 4280 Patterson Dr. #25, Diamond Springs, Calif. 95619
Filed Aug. 24, 1984, Ser. No. 644,069
Term of patent 14 years
U.S. Cl. D7—105

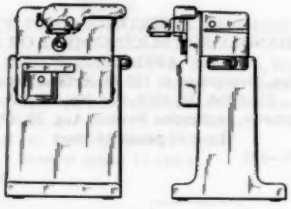


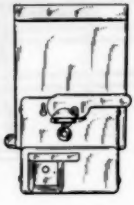
291,170
SPOON OR SIMILAR ARTICLE
Ellen B. Manderfield, Syracuse, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Mar. 21, 1985, Ser. No. 714,477
Term of patent 14 years
U.S. Cl. D7—143

291,171
KNIFE HANDLE FOR SLICING MEAT OR SIMILAR ARTICLE
Göran Ygfors, Kvarnvägen 6, 175 41 Järfälla, Sweden
Filed Feb. 21, 1985, Ser. No. 703,749
Claims priority, application Sweden, Aug. 30, 1984, 84-2324
Term of patent 14 years
U.S. Cl. D7—152

291,172
CONTAINER INSERT
Robert M. Bishop, and Louis G. Ditton, both of Fort Wayne, Ind., assignors to Essex Group, Inc., Fort Wayne, Ind.
Filed Oct. 19, 1984, Ser. No. 662,484
Term of patent 14 years
U.S. Cl. D7—387

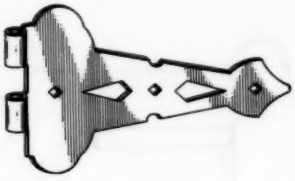
291,173
ELECTRIC CAN OPENER
Davin Stowell; Tucker Viemeister, both of New York, N.Y., and Thomas Dair, Hoboken, N.J., assignors to Sanyei Corporation, Japan
Division of Ser. No. 574,925, Jan. 30, 1984, Pat. No. Des. 288,277. This application May 30, 1986, Ser. No. 869,069
Term of patent 14 years
U.S. Cl. D8—36



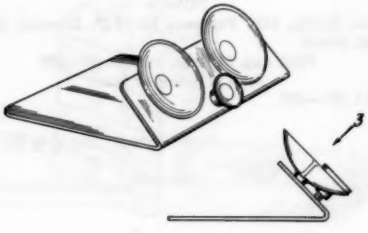


291,174
CORKSCREW
Stephan Koziol, 6120 Michelstadt/Odenwald, Fed. Rep. of Germany
Filed Aug. 17, 1984, Ser. No. 642,063
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1984, MR-799
Term of patent 14 years
U.S. Cl. D8—38

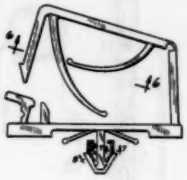
291,175
HINGE STRAP
Gerald H. Rogers, Rte. 1, Athens, Tex. 75751
Filed Nov. 1, 1985, Ser. No. 794,401
Term of patent 14 years
U.S. Cl. D8—327



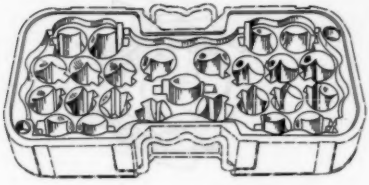
291,176
SUPPORT BRACKET FOR A RADAR DETECTOR
Steven Sokol, Southfield, Mich., assignor to Detroit Bracket Company, Inc., Redford Township, Wayne County, Mich.
Continuation-in-part of Ser. No. 776,793, Sep. 17, 1985. This application Jul. 14, 1986, Ser. No. 885,307
Term of patent 14 years
U.S. Cl. D8—380



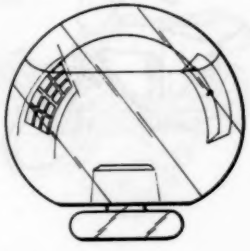
291,177
FLAT WIRE CLIP
Donald Santucci, Wheaton, and Phillip W. Denemark, Bloomingdale, both of Ill., assignors to Dek, Inc., St. Charles, Ill.
Filed Oct. 18, 1985, Ser. No. 789,075
Term of patent 14 years
U.S. Cl. D8—395



291,178
CONTAINER INTERIOR
Maxwell H. Toms, Maribyrnong, Australia, assignor to The Commonwealth of Australia, Canberra, Australia
Filed Jul. 17, 1984, Ser. No. 631,798
Claims priority, application Australia, Jan. 20, 1984, 6312/84
Term of patent 14 years
U.S. Cl. D9—345



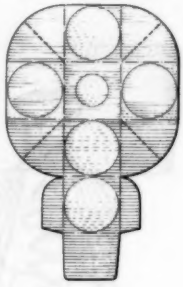
291,179
PERFUME BOTTLE
Maud Frizon, 40 E. 94th St., New York, N.Y. 10028
Filed Oct. 23, 1984, Ser. No. 664,053
Term of patent 14 years
U.S. Cl. D9—371



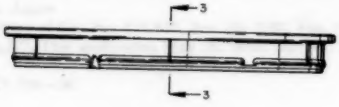
291,180
BOTTLE
Michele Averna, deceased, late of Caltanissetta, Italy (by Anna Maria Averna, Francesco Maria Claudio Averna, heirs), assignor to Fratelli Averna S.P.A., Caltanissetta, Italy
Filed Aug. 10, 1983, Ser. No. 521,607
Claims priority, application Italy, Feb. 11, 1983, 11560/83[U]
Term of patent 14 years
U.S. Cl. D9—405

291,181
COMBINED SHIPPING CONTAINER AND COCKTAIL PREPARATION PACKAGE
Richard E. Franco, 121 SW. 5th Ct., Pompano Beach, Fla. 33060
Filed Nov. 26, 1984, Ser. No. 674,935
Term of patent 14 years
U.S. Cl. D9—428

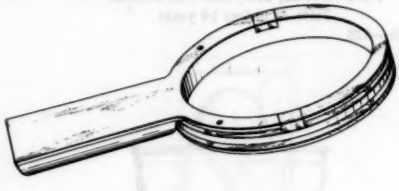
291,182
CONTAINER BLANK
Giancarlo Pelosi, Messina, Italy, assignor to Blue Point of Italy, New York, N.Y.
Filed Nov. 13, 1984, Ser. No. 670,756
Term of patent 14 years
U.S. Cl. D9—433



291,183
LID FOR A CONTAINER
John D. Messenger, Swindon, England, assignor to Metal Box p.l.c., United Kingdom
Filed Jul. 5, 1984, Ser. No. 627,988
The portion of the term of this patent subsequent to Jul. 5, 1997, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—454



291,184
HOLDER FOR PAINT CAN
Conrad J. Baril, P.O. Box 1263, Barstow, Calif. 92311
Filed Apr. 23, 1984, Ser. No. 602,972
Term of patent 14 years
U.S. Cl. D9—455

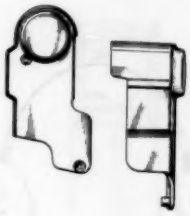


291,185
CHROMATOGRAPHY CASSETTE
S. Nicholas Stiso, San Jose, and Robert F. Zuk, Menlo Park, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.
Filed Nov. 15, 1984, Ser. No. 672,546
Term of patent 14 years
U.S. Cl. D10—81

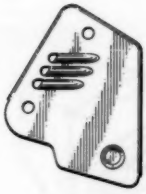
291,186
CLOCK CASING
Roy R. Cunningham, 20349 NE. Sandy Blvd., Troutdale, Oreg. 97060
Filed Feb. 12, 1985, Ser. No. 701,041
Term of patent 14 years
U.S. Cl. D10—128

291,187
BICYCLE
Stephen W. Smith, and Joel C. Cunard, both of Bedford, Pa., assignors to Hedstrom Corporation, Bedford, Pa.
Filed Sep. 20, 1985, Ser. No. 778,419
Term of patent 14 years
U.S. Cl. D12—111

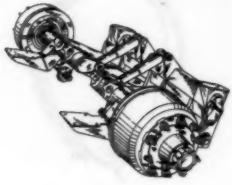
291,188
MOTORCYCLE FUEL PUMP COVER
Alwin J. Stahel, St. Paul, Minn., assignor to Drag Specialties, Inc., Minnetonka, Minn.
Filed Sep. 14, 1984, Ser. No. 650,624
Term of patent 14 years
U.S. Cl. D12—126



291,189
MOTORCYCLE CALIPER COVER
Alwin J. Stahel, St. Paul, Minn., assignor to Drag Specialties, Inc., Minnetonka, Minn.
Filed Jul. 13, 1984, Ser. No. 630,435
Term of patent 14 years
U.S. Cl. D12—126



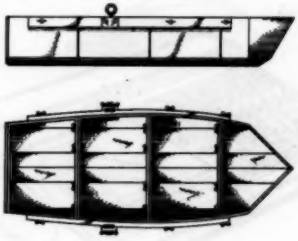
291,190
SUSPENSION UNIT FOR WHEELS OF A VEHICLE
Robert C. B. Davis, Sowerby, England, assignor to Rubery Owen-Rockwell Limited, Wednesbury, England
Filed Oct. 25, 1984, Ser. No. 664,787
Claims priority, application United Kingdom, May 3, 1984, 1 019 433
Term of patent 14 years
U.S. Cl. D12—160



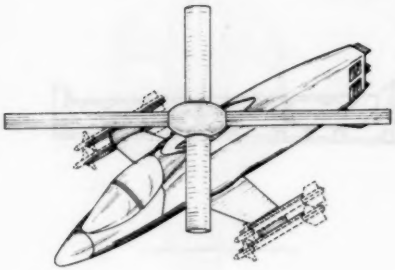
291,191
LOWER INNER PART OF A DOOR PANEL OF AN AUTOMOBILE
Björn E. A. Envall, Vänersborg, and Dick O. Ohlsson, Trollhättan, both of Sweden, assignors to Saab-Scania Aktiebolag, Trollhattan, Sweden
Filed May 31, 1984, Ser. No. 615,762
Term of patent 14 years
U.S. Cl. D12—190

291,192
REAR PART OF A SILL BEAM TO AN AUTOMOBILE
Björn E. A. Envall, Vänersborg, and Dick O. Ohlsson, Trollhättan, both of Sweden, assignors to Saab-Scania Aktiebolag, Trollhattan, Sweden
Filed May 31, 1984, Ser. No. 615,765
Term of patent 14 years
U.S. Cl. D12—190

291,193
NESTABLE PORTABLE BOAT
Robert D. Hanek, 6703 Lunar Dr., Anchorage, Ak. 99504
Filed Sep. 30, 1985, Ser. No. 781,810
Term of patent 14 years
U.S. Cl. D12—300

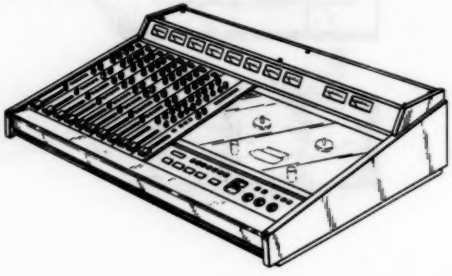


291,194
AIRCRAFT
John A. Binden, Long Beach, Calif., assignor to Northrop Corporation, Hawthorne, Calif.
Filed Nov. 13, 1984, Ser. No. 670,459
Term of patent 14 years
U.S. Cl. D12—327



291,195
PORTABLE SPEECH SYNTHESIZER FOR SPEECH IMPAIRED INDIVIDUALS
James P. Shea, P.O. Box 184, Clawson, Mich. 48017
Filed Apr. 27, 1984, Ser. No. 605,288
Term of patent 14 years
U.S. Cl. D14—1

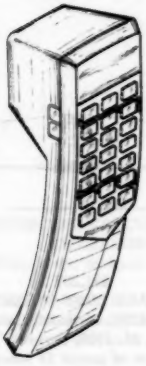
291,196
COMBINED TAPE RECORDER AND AUDIO MIXER
Masafumi Ito, Tokyo; Koji Suzuki, Tokorozawa; Shigeru Hasegawa, Kodaira, and Haruki Takita, Hachioji, all of Japan, assignors to Teac Corporation, Tokyo, Japan
Filed Mar. 5, 1985, Ser. No. 708,427
Claims priority, application Japan, Sep. 7, 1984, 59-37317
Term of patent 14 years
U.S. Cl. D14—5



291,197
HEADSET OR SIMILAR ARTICLE
Claude LaLanne, 147 E. 69th St., New York, N.Y. 10021
Filed Jan. 14, 1985, Ser. No. 691,123
Term of patent 14 years
U.S. Cl. D14—36

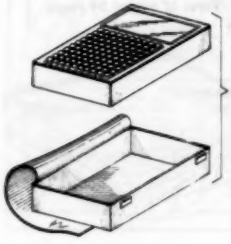
291,198
HEADPHONE
Mario Bellini, Milan, Italy, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan
Filed Feb. 22, 1985, Ser. No. 704,289
Claims priority, application Japan, Aug. 30, 1984, 59-36297
Term of patent 14 years
U.S. Cl. D14—36

291,199
HANDSET FOR MOBILE TELEPHONE
Katsuhito Watanabe, Warabe, Japan, assignor to Oki America, Inc., Hackensack, N.J.
Filed Sep. 30, 1985, Ser. No. 782,117
Term of patent 14 years
U.S. Cl. D14—64

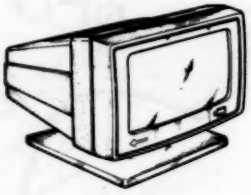


291,200
SHOULDER SUPPORT FOR TELEPHONE HANDSET
Lyle H. Van Dyke, 4411 SW. Twombly Ave., Portland, Oreg. 97201
Filed Feb. 25, 1985, Ser. No. 705,018
Term of patent 14 years
U.S. Cl. D14—65

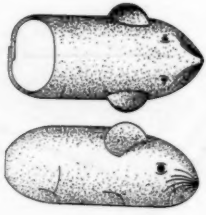
291,201
COMBINED HAND HELD PORTABLE COMPUTER AND CARRYING CASE THEREFOR
Charles W. Weisel, Jr., 93 Top Sail Ct., Greenville, S.C. 29611, and Lewie H. Miller, Jr., Rte. 12, Thriftside Dr., Greenville, S.C. 29609
Filed Nov. 6, 1984, Ser. No. 668,830
Term of patent 14 years
U.S. Cl. D14—100



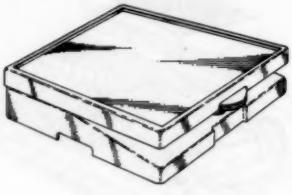
291,202
COMPUTER MONITOR
Youn H. Chang, Suwon-Si, and Soo D. Kim, Seoul, both of Rep. of Korea, assignors to Samsung Electron Devices Co., Ltd., Kyungki-Do, Rep. of Korea
Filed Jun. 11, 1985, Ser. No. 743,582
Claims priority, application Rep. of Korea, Dec. 17, 1984, 84-14992
Term of patent 14 years
U.S. Cl. D14—113



291,203
COVER FOR COMPUTER MOUSE
Gary S. Silver, 2060 W. Chase St., Chicago, Ill. 60645
Filed Jul. 20, 1984, Ser. No. 633,017
Term of patent 14 years
U.S. Cl. D14—114



291,204
ADJUSTABLE CRT SUPPORTING STAND
James F. Hampshire, Stephens City, and Larry S. Hawkins, Winchester, both of Va., assignors to Rubbermaid Commercial Products, Winchester, Va.
Filed Jan. 25, 1985, Ser. No. 695,140
Term of patent 14 years
U.S. Cl. D14—114

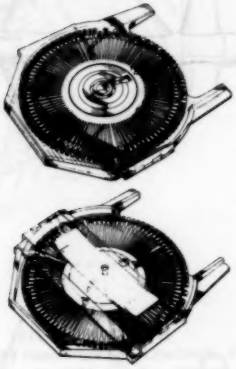


291,205
MICROFILM RETRIEVAL TERMINAL OR THE LIKE
Monte D. Lavine, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Feb. 14, 1985, Ser. No. 701,728
Term of patent 14 years
U.S. Cl. D16—14

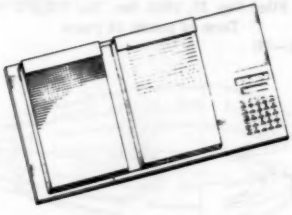
291,206
EYE GLASSES OR SIMILAR ARTICLE
Andrew J. Hyman, 3115 Rolling Rd., Chevy Chase, Md. 20815
Filed Nov. 6, 1985, Ser. No. 803,902
Term of patent 14 years
U.S. Cl. D16—111

291,207
CONTACT LENS INSERTER
Kendall C. Kunz, Box 1292, Idyllwild, Calif. 92349
Filed Feb. 11, 1985, Ser. No. 700,479
Term of patent 14 years
U.S. Cl. D16—124

291,208
PRINT WHEEL CARTRIDGE FOR TYPEWRITER
Kenji Tamada; Junya Yamakawa, and Kazuaki Takahashi, all of Tokyo, Japan, assignors to Silver Seiko Limited, Japan
Filed Oct. 24, 1985, Ser. No. 790,826
Claims priority, application Japan, Apr. 30, 1985, 60-017775
Term of patent 14 years
U.S. Cl. D18—12



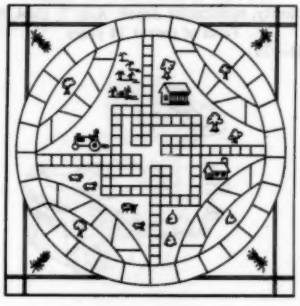
291,209
COMBINED NOTEBOOK, CALCULATOR AND CASING THEREFOR
Rinaldo Nava, Milan, Italy, assignor to Nava Milano S.p.A., Milan, Italy
Filed Jul. 10, 1984, Ser. No. 629,527
Claims priority, application Italy, Jan. 20, 1984, 20601/84[U]
Term of patent 14 years
U.S. Cl. D19—26



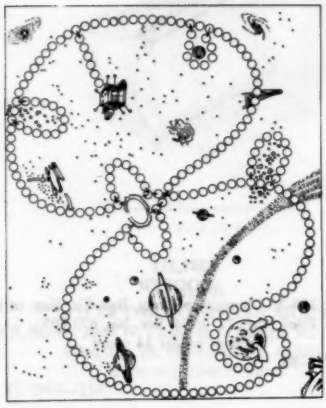
291,210
PANEL FOR RECEIVING ADVERTISING MATERIAL
Pierre Labbe, Moulin d'en Haut, Noyal, and Benoit Labbe, 4, rue des Hauts Bois, both of 22400 Lamballe, France
Filed Jul. 11, 1985, Ser. No. 753,974
Claims priority, application France, Jan. 11, 1985, 85 0117
Term of patent 14 years
U.S. Cl. D20—43

291,211
SCOOTER
Na C. Man, 199-30 Chungchun-Dong, Buk-Ku, Rep. of Korea
Filed Nov. 21, 1984, Ser. No. 673,897
Term of patent 14 years
U.S. Cl. D21—80

291,212
GAME BOARD
Ronald Simons, HC Box 445, Sharon Springs, Kans. 67758
Filed Feb. 25, 1985, Ser. No. 705,381
Term of patent 14 years
U.S. Cl. D21—25

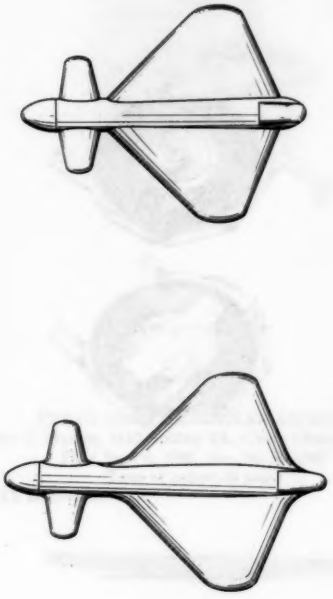


291,213
GAME BOARD
William C. Tackett, 629 Hancock Ct., Ferndale, Mich. 48220
Filed Feb. 28, 1985, Ser. No. 706,784
Term of patent 14 years
U.S. Cl. D21—31

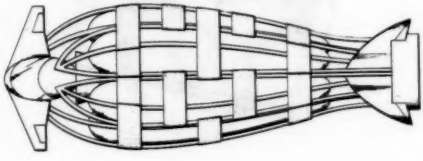


291,214
TOY VEHICLE
Shinroku Nakao, Kanagawa; Yoshiyasu Ishii, and Taira Hanashima, both of Tokyo, all of Japan, assignors to Combi Co., Ltd., Tokyo, Japan
Filed Feb. 1, 1985, Ser. No. 697,367
Claims priority, application Japan, Aug. 7, 1984, 59-33299
Term of patent 14 years
U.S. Cl. D21—76

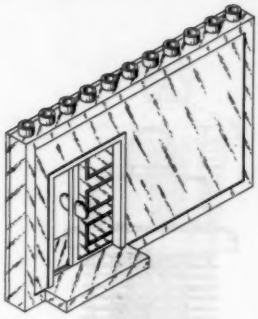
291,215
AIR VEHICLE
Winfield H. Arata, Jr., 4414 Countrywood Dr., Santa Maria, Calif. 93455
Filed Jul. 18, 1985, Ser. No. 756,441
Term of patent 14 years
U.S. Cl. D21—87



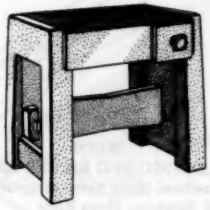
291,216
AIRSHIP
Brian C. Motts, 244 S. La Alameda, San Pedro, Calif. 90731
Filed Sep. 23, 1985, Ser. No. 779,272
Term of patent 14 years
U.S. Cl. D21—90



291,217
TOY BUILDING UNIT
Erik P. Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 4, 1985, Ser. No. 805,334
Term of patent 14 years
U.S. Cl. D21—108

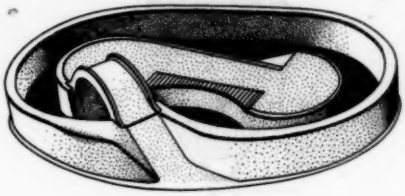


291,218
TOY WORKBENCH
James F. Mariol, 481 Dean View Dr., Cincinnati, Ohio 45224
Filed Jan. 16, 1985, Ser. No. 692,360
Term of patent 14 years
U.S. Cl. D21—121



291,219
TOY SEAT OR SIMILAR ARTICLE
Jan Ryaa, Billund, and Ole V. Poulsen, Vejle, both of Denmark, assignors to Interlego A.G., Baar, Switzerland
Filed Dec. 4, 1985, Ser. No. 805,196
Term of patent 14 years
U.S. Cl. D21—123

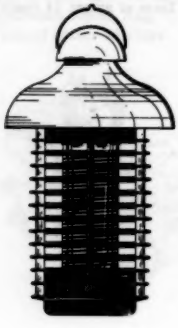
291,220
TOY WATERWAY
James F. Mariol, 481 Dean View Dr., Cincinnati, Ohio 45224
Filed Jan. 16, 1985, Ser. No. 692,284
Term of patent 14 years
U.S. Cl. D21—143



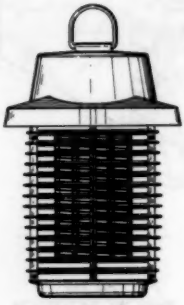
291,221
DOLL
Janie P. Embry, 1013 Hermitage Dr., Owensboro, Ky. 42301
Filed Feb. 11, 1985, Ser. No. 700,716
Term of patent 14 years
U.S. Cl. D21—159

291,222
TENNIS RACKET
Benedikt Király, 29, Mårdvägen, Huddinge S-141 40, Sweden
Filed Mar. 19, 1984, Ser. No. 591,153
Claims priority, application Sweden, Oct. 24, 1983, 83-2741
Term of patent 14 years
U.S. Cl. D21—212

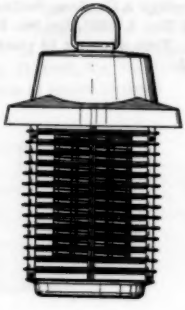
291,223
ELECTRIC BUG KILLER LAMP
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Jan. 3, 1985, Ser. No. 688,593
Claims priority, application United Kingdom, Jul. 17, 1984, 1020968
Term of patent 14 years
U.S. Cl. D22—123



291,224
ELECTRIC BUG KILLER LAMP
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Jan. 4, 1985, Ser. No. 688,972
Claims priority, application United Kingdom, Aug. 3, 1984, 1021319
Term of patent 14 years
U.S. Cl. D22—123

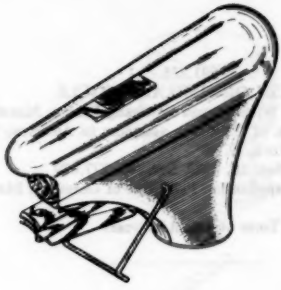


291,225
ELECTRIC BUG KILLER LAMP
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Jan. 4, 1985, Ser. No. 689,074
Claims priority, application United Kingdom, Aug. 3, 1984, 1021318
Term of patent 14 years
U.S. Cl. D22—123



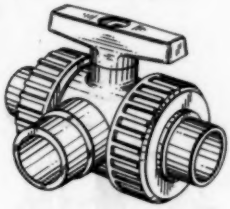
291,226
INSECT KILLING LAMP
Albert Wan, Tsuen Wan, Hong Kong, assignor to Fee Tat Plastic Factory Limited, Aberdeen, Hong Kong
Filed Feb. 12, 1985, Ser. No. 700,637
Claims priority, application United Kingdom, Dec. 6, 1984, 1023770
Term of patent 14 years
U.S. Cl. D22—123

291,227
COMBINED FISHERMAN'S LAMP AND CLIPPER
Clyde R. Evans, 117 24th Ave., N.W., Birmingham, Ala. 35215
Filed Dec. 3, 1984, Ser. No. 677,583
Term of patent 14 years
U.S. Cl. D22—149



291,228
FISHHOOK EXTRACTOR
Clyde A. Krueger; Katharine C. Krueger, both of P.O. Box 2, Lonsdale, Minn. 55046; Herman A. Preus, 104 Second St., NE., New Prague, Minn. 56071, and Bruce D. Nelson, 5042 Bryant Ave., South, Minneapolis, Minn. 55419
Filed Dec. 13, 1984, Ser. No. 681,432
Term of patent 14 years
U.S. Cl. D22—149

291,229
VALVE
Peter Kunz, Schaffhausen, Switzerland, assignor to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland
Filed Oct. 10, 1984, Ser. No. 659,336
Claims priority, application Hague, Apr. 11, 1984, DM/003634
Term of patent 14 years
U.S. Cl. D23—19

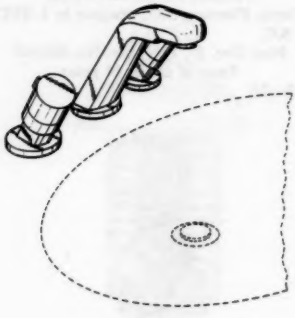


291,230
VALVE
Peter Kunz, Schaffhausen, Switzerland, assignor to Georg Fischer Atkiengesellschaft
Filed Oct. 10, 1984, Ser. No. 659,337
Claims priority, application Hague, Apr. 11, 1984, DM/003634
Term of patent 14 years
U.S. Cl. D23—19

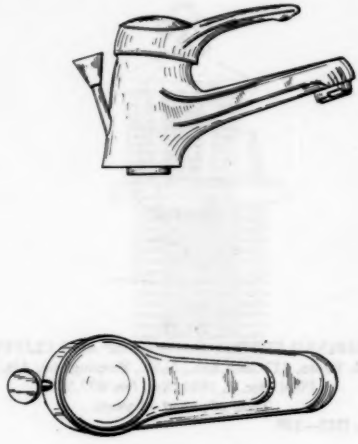
291,231
PRESSURE REGULATOR
Bishnu P. Datta, Florence, S.C., assignor to L-TEC Company, Florence, S.C.
Filed Dec. 27, 1984, Ser. No. 686,694
Term of patent 14 years
U.S. Cl. D23—21

291,232
FAUCET
Andreas Haug, Altensteig, and Thomas Schönherr, Egenhausen, both of Fed. Rep. of Germany, assignors to Hans Grohe GmbH & Co. KG, Fed. Rep. of Germany
Filed Sep. 4, 1985, Ser. No. 772,357
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, MR 1158 OB
Term of patent 14 years
U.S. Cl. D23—23

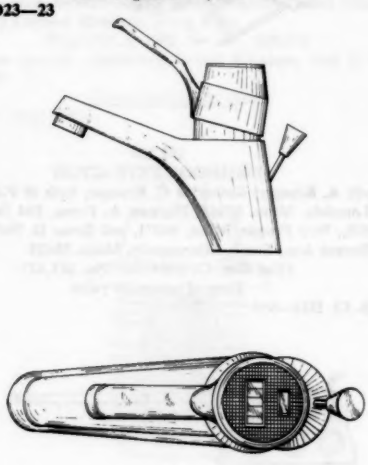
291,233
FAUCET SET
Franz W. Jans, Offenbach am Main, Fed. Rep. of Germany, assignor to Jado Bathroom and Hardware Manufacturing, Inc., Camarillo, Calif.
Filed Nov. 12, 1985, Ser. No. 804,748
Term of patent 14 years
U.S. Cl. D23—25



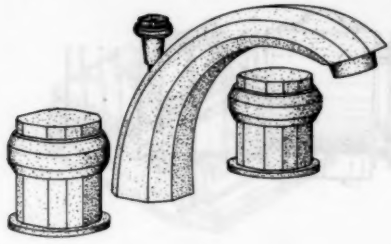
291,234
FAUCET OR SIMILAR ARTICLE
Konrad Bergmann, Wittlich, and Wolfgang Fabian, Mannheim, both of Fed. Rep. of Germany, assignors to American Standard Inc., New York, N.Y.
Filed Sep. 18, 1985, Ser. No. 777,478
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 20 MR 2050
Term of patent 14 years
U.S. Cl. D23—23



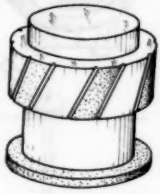
291,235
FAUCET OR SIMILAR ARTICLE
Konrad Bergmann, Wittlich, and Wolfgang Fabian, Mannheim, both of Fed. Rep. of Germany, assignors to American Standard Inc., New York, N.Y.
Filed Sep. 18, 1985, Ser. No. 777,479
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 20MR2050
Term of patent 14 years
U.S. Cl. D23—23



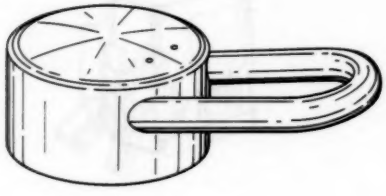
291,236
FAUCET SET
Jean-Claude Delepine, 23, Rue de Clapeyron, 75008, Paris, France
Filed Oct. 10, 1985, Ser. No. 786,093
Claims priority, application Hague, May 3, 1985, DM/005222
Term of patent 14 years
U.S. Cl. D23—25



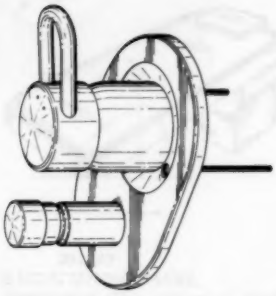
291,237
FAUCET HANDLE
Jean-Claude Delepine, 23, Rue de Clapeyron, 75008, Paris, France
Filed Oct. 10, 1985, Ser. No. 786,092
Claims priority, application Hague, May 3, 1985, DM/005222
Term of patent 14 years
U.S. Cl. D23—28



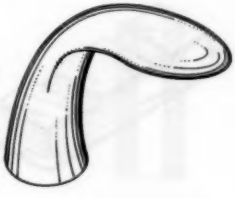
291,238
FAUCET HANDLE
Andreas Haug, Altensteig, and Thomas Schönherr, Egenhausen, both of Fed. Rep. of Germany, assignors to Hans Grohe GmbH & Co. KG, Fed. Rep. of Germany
Filed Sep. 4, 1985, Ser. No. 772,354
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, MR 1158 Ob
Term of patent 14 years
U.S. Cl. D23—29



291,239
COMBINED ESCUTCHEON, WATER VALVE AND DIVERTER VALVE FOR BATHTUB SHOWER UNITS
Andreas Haug, Altensteig, and Thomas Schönherr, Egenhausen, both of Fed. Rep. of Germany, assignors to Hans Grohe GmbH & Co. KG, Fed. Rep. of Germany
Filed Sep. 4, 1985, Ser. No. 772,343
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, MR 1158-OB
Term of patent 14 years
U.S. Cl. D23—31



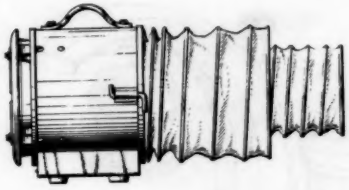
291,240
SPOUT BODY
Manfred Rademacher, Freiligrathstrasse 19, 4 Düsseldorf, Fed. Rep. of Germany
Filed Apr. 22, 1985, Ser. No. 726,075
Claims priority, application Fed. Rep. of Germany, Oct. 26, 1984, 5353
Term of patent 14 years
U.S. Cl. D23—32

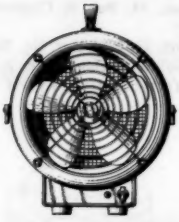


291,241
SPOUT
Manfred Rademacher, Freiligrathstrasse 19, 4 Dusseldorf, Fed. Rep. of Germany
Filed Sep. 12, 1985, Ser. No. 775,493
Claims priority, application Fed. Rep. of Germany, Apr. 6, 1985, 5408(A159)
Term of patent 14 years
U.S. Cl. D23—32

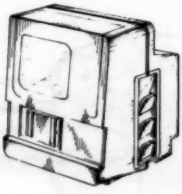
291,242
REFILL FOR A FRAGRANCE DISPENSER
Theodore A. Harden, Middletown, N.Y., and Richard E. Scott, East Brunswick, N.J., assignors to Takasago USA, Inc., Rockleigh, N.J. and Piezo Electric Products, Inc., Cambridge, Mass.
Filed May 17, 1985, Ser. No. 735,170
Term of patent 14 years
U.S. Cl. D23—150

291,243
COMBINED VENTILATING AND PURGING BLOWER
Allan E. Beavers, Littleton, Colo., assignor to T.A. Peisue Company, Englewood, Colo.
Filed Oct. 11, 1985, Ser. No. 786,503
Term of patent 14 years
U.S. Cl. D23—162

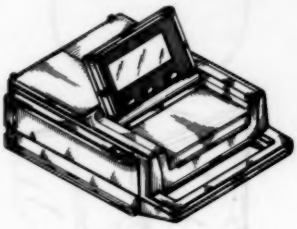




291,244
ELECTROCARDIOGRAM MONITOR FOR PHYSIOLOGICAL CONDITION
Paul W. Jones, Issaquah, and James A. Benson, Bellevue, both of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Jan. 8, 1985, Ser. No. 689,749
Term of patent 14 years
U.S. Cl. D24—17



291,245
DEFIBRILLATOR
Dennis M. Lanci, Redmond, and Mike M. Pauli, Seattle, both of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Apr. 18, 1985, Ser. No. 724,756
Term of patent 14 years
U.S. Cl. D24—17

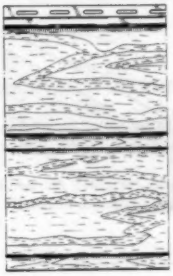


291,246
DRILL GUIDE INSTRUMENT FOR SURGICAL USE OR THE LIKE
Jerry L. Lower, Bourbon, Ind., assignor to Zimmer, Inc., Warsaw, Ind.
Filed Mar. 5, 1985, Ser. No. 708,617
Term of patent 14 years
U.S. Cl. D24—26

291,247
MEDICAL DEVICE CLIP OR THE LIKE FOR ATTACHING A SURGICAL WOUND DRAINAGE EVACUATOR OR THE LIKE TO VARIOUS SITES
Eugene E. Weilbacher, New Philadelphia, Ohio, assignor to Snyder Laboratories, Inc., Dover, Ohio
Filed Feb. 7, 1985, Ser. No. 699,365
Term of patent 14 years
U.S. Cl. D24—27

291,248
INTRAPELVIC DISPLACEMENT PROSTHESIS
Paul H. Sugarbaker, Bethesda, Md., and John C. Hancock, Santa Barbara, Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.
Filed Sep. 14, 1984, Ser. No. 650,586
Term of patent 14 years
U.S. Cl. D24—33

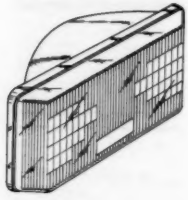
291,249
BUILDING SIDING PANEL
John M. Manning, Worthington, Ohio, assignor to Vinyl Improvement Products Company, Columbus, Ohio
Filed Sep. 26, 1984, Ser. No. 655,356
Term of patent 14 years
U.S. Cl. D25—73



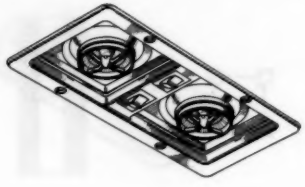
291,250
DECORATIVE EXTRUSION
Peter M. Stagl, Morris Plains, N.J., assignor to Avnet, Inc., New York, N.Y.
Filed Nov. 1, 1984, Ser. No. 667,592
Term of patent 14 years
U.S. Cl. D25—75

291,251
DECORATIVE EXTRUSION
Peter M. Stagl, Morris Plains, N.J., assignor to Avnet, Inc., New York, N.Y.
Filed Nov. 1, 1984, Ser. No. 667,462
Term of patent 14 years
U.S. Cl. D25—75

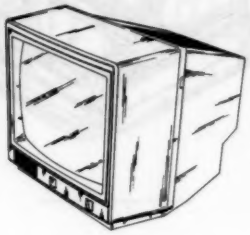
291,252
FOG LIGHT
Matsuo Ichikawa, Takasaki, Japan, assignor to Ichikawa Press Industry Co., Ltd., Japan
Filed Jul. 18, 1984, Ser. No. 631,901
Term of patent 14 years
U.S. Cl. D26—29



291,253
INTERIOR PANEL LIGHTING FIXTURE FOR VEHICLE OR THE LIKE
Charles J. Ortega, Los Angeles, Calif., assignor to Xantech Corporation, Sylmar, Calif.
Filed Aug. 12, 1986, Ser. No. 895,717
Term of patent 14 years
U.S. Cl. D26—29

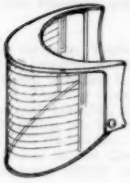


291,254
IMAGE DISPLAY MONITOR
Takeshi Tsuruta; Takuo Yoshitani; Shosaku Kanoh; Eiichi Kamiya, and Yasuyuki Tamaki, all of Kanagawa, Japan, assignors to International Business Machines Corp., Armonk, N.Y.
Filed Sep. 19, 1984, Ser. No. 652,047
Claims priority, application Japan, Mar. 23, 1984, 59-10995
Term of patent 14 years
U.S. Cl. D14—113

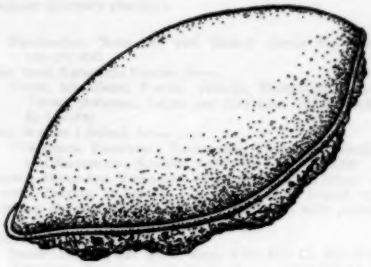


291,255
OIL LAMP WICK HOLDER
Susan H. Levine, Richmond, Calif., assignor to Pottery by Levine, Inc., Richmond, Calif.
Filed May 28, 1985, Ser. No. 737,738
Term of patent 14 years
U.S. Cl. D26—116

291,256
FACE SHIELD
James Hollander, Main St., Goshen, Mass. 01032
Filed Mar. 6, 1986, Ser. No. 842,006
Term of patent 14 years
U.S. Cl. D29—16

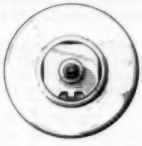


291,258
HOUSEHOLD SPONGE
Richard E. Greer, Sr., Mauldin, S.C., assignor to Swiss-Tex, Incorporated, Greenville, S.C.
Filed Jan. 16, 1985, Ser. No. 691,904
Term of patent 14 years
U.S. Cl. D32—40



291,257
WOOD DUCK BOX
Craig C. Thoeny, and Mark G. Thoeny, both of 4125 Railroad Ave., Robbinsdale, Minn. 55422
Filed Jan. 17, 1985, Ser. No. 692,167
Term of patent 14 years
U.S. Cl. D30—3

291,259
FLUID CARTRIDGE FOR A CLEANING TOOL OR THE LIKE
Samuel C. Heck, and David J. Bokmiller, both of San Antonio, Tex., assignors to Sani-Fresh International, Inc., San Antonio, Tex.
Filed Sep. 20, 1984, Ser. No. 652,874
Term of patent 14 years
U.S. Cl. D32—45



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF AUGUST, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Nattermann & CIE. GmbH: *See*—
Schulz, Volker; Leyck, Sigurd; Durr, Manfred; Ghyczy, Miklos; Wendel, Armin; and Hager, Jorg, 4,684,632, Cl. 514-78.000.

A/S Niro Atomizer: *See*—
Svarrer, Lauge, 4,684,065, Cl. 239-224.000.

AB Svenska Flaktfabriken: *See*—
Bjorklund, Bjorn, 4,683,870, Cl. 126-271.100.

Abbe, Bruce W.; and Cole, Jack M., to Phillips Petroleum Company. Precipitation of waste chromium compounds utilizing an aqueous sulfide solution. 4,684,472, Cl. 210-720.000.

Abe, Katsuhiro; Kobayashi, Yoshinobu; and Baba, Mitsushige, to Mitsubishi Petrochemical Co., Ltd. Thermoplastic resin composition having improved moldability comprising homogeneous blends of the resin with diamides. 4,684,684, Cl. 524-227.000.

Abe, Masakazu: *See*—
Maruno, Naohiko; Abe, Masakazu; and Ogawa, Tetsuo, 4,684,842, Cl. 310-316.000.

Abe, Tsutomu: *See*—
Hirosawa, Toshiaki; Akiyama, Yoshie; Ebisawa, Isao; Hattori, Yoshifumi; and Abe, Tsutomu, 4,684,962, Cl. 346-140.00R.

Abeles, Benjamin; Eberhardt, Wolfgang U.; and Tiedje, J. Thomas, to Exxon Research and Engineering Company. X-ray mirrors made from multi-layered material. 4,684,565, Cl. 428-220.000.

Abernathy, Earl D., to Multiflex, Inc. Method of forming an improved hose bundle. 4,684,427, Cl. 156-244.120.

Abu-Isa, Ismat A., to General Motors Corporation. Evaporative fuel control canister containing EPDM foam filter. 4,684,382, Cl. 55-316.000.

Acampora, Alfonse; and Lu, Chung H., to RCA Corporation. Non-linear processor for reducing the dynamic range of a digitized error signal. 4,684,983, Cl. 358-135.000.

Achiha, Hikaru: *See*—
Ohya, Kanji; and Achiha, Hikaru, 4,684,843, Cl. 310-355.000.

Acker, Norbert. Intelligent display system for indicating successively occuring numerical values. 4,685,073, Cl. 364-551.000.

Ackerman, David A.; Camarda, Renato M.; Hartman, Robert L.; and Spector, Magaly, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Method of manufacturing high-quality semiconductor light-emitting devices. 4,684,883, Cl. 324-71.500.

Acquaviva, Thomas, to Xerox Corporation. Plural image document set copying. 4,684,241, Cl. 355-14.0SH.

Acquista, Angelo. Bronchofiberscope. 4,683,874, Cl. 128-6.000.

Adachi, Toshio, to Meishintoryo Co. Ltd. Surgical cement from amorphous tricalcium phosphate, poly(carboxylic acid) and water. 4,684,673, Cl. 523-116.000.

Adams, John T.; and Mueller, Dale A., to Honeywell Inc. Furnace fan control. 4,684,060, Cl. 236-11.000.

Adams, Victor J.; and Schofield, Brooks L., Jr., to Motorola, Inc. Axial pressure sensor. 4,683,757, Cl. 73-756.000.

Adams, William C., Jr.; and Patisaul, Charles R., to Harris Corporation. Maximum likelihood estimation of G/T of satellite earth terminals using extraterrestrial radio sources. 4,684,955, Cl. 342-351.000.

Adams, William R.: *See*—
Van Driesen, Roger P.; Adams, William R.; Caspers, John; Baldasarri, Mario; and Trimble, Harold, 4,684,456, Cl. 208-143.000.

Adeka Argus Chemical Co., Ltd.: *See*—
Kubota, Naohiro; and Nishimura, Atsushi, 4,684,679, Cl. 524-91.000.
Kubota, Naohiro; Shibata, Toshihiro; and Nishimura, Atsushi, 4,684,680, Cl. 524-91.000.

Ader, Joseph R.: *See*—
Dischert, Robert A.; Ader, Joseph R.; and Topper, Robert J., 4,684,977, Cl. 358-31.000.

Adolph Coors Company: *See*—
Rice, Steven J.; Thompson, Gilbert M.; Dolph, Michael W.; and Montoya, Daniel D., 4,684,259, Cl. 366-185.000.
Rusnock, Kevin R., 4,684,059, Cl. 229-52.00B.

Aeronatical Research Associates of Princeton, Inc.: *See*—
Snedeker, Richard S., 4,683,800, Cl. 89-36.020.

Afimiwala, Khurshid A., to Dresser Industries, Inc. Two-stage composite piston. 4,683,810, Cl. 92-212.000.

AG-JBC (Sarl): *See*—
Chretien, Jean-Basile, 4,684,548, Cl. 427-197.000.

Agence Spatiale Europeenne: *See*—
Cable, Neil, 4,684,285, Cl. 403-331.000.

Agosta, Roy P., to Robbins Auto Top Co., Inc. Method and apparatus for forming automobile convertible tops. 4,684,419, Cl. 156-93.000.

Aiba, Shigeo: *See*—
Mochizuki, Hiroyuki; Kobayashi, Nobuo; Inuzuka, Yutaka; Aiba, Shigeo; and Nishi, Setsuo, 4,683,769, Cl. 74-422.000.

Air Products and Chemicals, Inc.: *See*—
Chen, Michael S., 4,684,514, Cl. 423-574.00R.
Fernbacher, John M.; and Hansel, James G., 4,683,947, Cl. 166-251.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Nishii, Michiharu; Furuta, Youichi; Tsubouchi, Kaoru; Murata, Takeo; Shibatani, Juichi; and Kiriyama, Takashi, 4,683,807, Cl. 92-169.000.

Aisin Warner Limited: *See*—
Yokoyama, Fumitomo; Kuwayama, Yoshinari; Tatsuta, Mitsugu; and Kuramochi, Koujiro, 4,683,903, Cl. 137-56.000.

Aizawa, Masandou; Yamauchi, Shigekazu; Sekine, Hisao; and Yamamoto, Takeshi, to Stanley Electric Co., Ltd. Liquid crystal color display device having two-layered electrode with pinhole connections. 4,684,218, Cl. 350-339.00F.

Ajinomoto Co., Inc.: *See*—
Sasaki, Hitoshi; and Igota, Shoji, 4,684,553, Cl. 428-35.000.
Takemoto, Tadashi; and Ariyoshi, Yasuo, 4,684,745, Cl. 560-41.000.

Akagiri, Kenzo; and Nishiguchi, Masayuki, to Sony Corporation. Apparatus for transmitting digital signals. 4,685,115, Cl. 375-25.000.

Akita, Shigeyuki: *See*—
Kitamura, Sotoo; Akita, Shigeyuki; and Kago, Yoshiyuki, 4,684,943, Cl. 340-825.720.

Akiyama, Hirosi: *See*—
Hanazono, Masanobu; Hara, Shinichi; Akiyama, Hirosi; Hayashi, Masaaki; Saitoo, Harunobu; and Kurisu, Takumi, 4,685,014, Cl. 360-126.000.

Akiyama, Steven R.; Zaker, Ronald C.; and Shoup, Curtis C., to Cooper Industries, Inc. Spring loaded recessed lighting fixture thermal protection. 4,685,037, Cl. 362-276.000.

Akiyama, Susumu: *See*—
Sato, Yoshihisa; Kinugawa, Masumi; Akiyama, Susumu; Yamada, Toshitaka; Mizuno, Tiaki; and Suzuki, Atsushi, 4,683,858, Cl. 123-486.000.

Akiyama, Yoshie: *See*—
Hirosawa, Toshiaki; Akiyama, Yoshie; Ebisawa, Isao; Hattori, Yoshifumi; and Abe, Tsutomu, 4,684,962, Cl. 346-140.00R.

Akopov, Ernest M.; Schitinin, Valery E.; and Arapova, Anna V. Surgical instrument. 4,684,051, Cl. 227-19.000.

Aktiebolaget SKF: *See*—
Sahlgren, Anders; Gustafsson, Rolf; Goransson, Bo; and Sundqvist, Yngve, 4,684,268, Cl. 384-574.000.

Akutsu, Shigeru: *See*—
Yasufuku, Yoshitaka; Nara, Masaji; and Akutsu, Shigeru, 4,684,572, Cl. 428-323.000.

Akzo N.V.: *See*—
Deets, Gary L.; and Tamalis, William G., 4,684,708, Cl. 527-312.000.

Alcatel Thomson Gigadisc, SA: *See*—
Romeas, Rene, 4,685,096, Cl. 369-44.000.

Alden, David H.: *See*—
Benson, Richard A.; and Alden, David H., 4,683,910, Cl. 137-519.000.

Alden Research Foundation: *See*—
Bliudnikas, Kestutis E., 4,684,961, Cl. 346-139.00A.
Swaffield, John D., 4,684,189, Cl. 439-587.000.

Alderson, Jill D.: *See*—
Milius, John W.; and Alderson, Jill D., 4,684,550, Cl. 427-437.000.

Aldridge, Robert E.; Elloway, Russell; Fritz, William O.; Goff, Ralph D.; and Herrera, Michael J., to Thermco Systems, Inc. Semiconductor wafer boat loader control system. 4,684,863, Cl. 318-599.000.

Alexander, Ranya L.: *See*—
Iltis, Rumult, 4,683,904, Cl. 137-78.300.

Alhauser, Erich. Apparatus for the treatment, in particular softening and/or complete desalination of water. 4,684,461, Cl. 210-96.100.

Ali, Fadia E.; and Huffman, William F., to SmithKline Beckman Corporation. Compositions and methods for producing vasodilation and antioxytocic activity. 4,684,622, Cl. 514-11.000.

Allen, Anthony P.; Forsmo, Sten; and Langley, John G., to Allied Colloids Limited. Iron ore pelletization. 4,684,549, Cl. 427-221.000.

Allen Fruit Co., Inc.: *See*—
Harper, Chester H., 4,683,706, Cl. 53-485.000.

Allen, James A.: *See*—
Tabor, Ricky L.; and Allen, James A., 4,684,576, Cl. 428-441.000.

Allgaier, Wayne F.; Tyjenski, Gerard M.; and Di Natale, Claude A., to General Motors Corporation. Rotary molding machine. 4,684,432, Cl. 156-500.000.

Allied Colloids Limited: *See*—
Allen, Anthony P.; Forsmo, Sten; and Langley, John G., 4,684,549, Cl. 427-221.000.

Allied Corporation: *See*—
Harrison, David M.; Gentili, Robert P.; and Bellucci, George N., 4,683,922, Cl. 141-9.000.
Hutter, Harold G., 4,684,201, Cl. 439-585.000.

Margolin, Mark; Moore, James E.; and Grois, Igor, 4,684,205, Cl. 350-96.210.
McGroary, Francis X., 4,684,902, Cl. 331-38.000.
Miller, Robert A.; and Marach, David R., 4,685,028, Cl. 361-334.000.
Reichardt, Manfred; and Schutzle, Gunter, 4,684,197, Cl. 439-404.000.
Richman, Jay L., 4,685,081, Cl. 365-1.000.
Yeh, Lun-Shu R.; Grenness, Morten; and Fuller, Robert J., 4,683,648, Cl. 29-623.500.
Allred, David: *See—*
Reyes, Jaime; and Allred, David, 4,685,030, Cl. 361-400.000.
Alpine Electronics Inc.: *See—*
Takahashi, Toshiaki; and Suzuki, Tokio, 4,684,928, Cl. 340-521.000.
Alps Electric Co.: *See—*
Oba, Hiroki, 4,684,775, Cl. 200-276.000.
Shimaoka, Motohiro; and Saito, Yukio, 4,685,011, Cl. 360-97.000.
Alps Electric Co., Ltd.: *See—*
Kando, Giichi; and Tomoyori, Makoto, 4,683,646, Cl. 29-611.000.
Matsunaga, Hiroshi; Shimojima, Yoji; Tokunaga, Ichiro; and Obata, Kosei, 4,684,210, Cl. 350-96.200.
Sato, Kazuo, 4,685,006, Cl. 360-64.000.
Alra Laboratories, Inc.: *See—*
Bhutani, Baldev R., 4,684,516, Cl. 424-19.000.
ALZA Corporation: *See—*
Eckenhoff, James B.; Cortese, Richard; and Landrau, Felix A., 4,684,524, Cl. 424-469.000.
Ambal, Gilbert, to ITW de France, D.A. Locking foot for securement to support. 4,683,611, Cl. 16-225.000.
Amdahl Corporation: *See—*
Lee, Hsiao-Peng S.; Rawlinson, Stephen J.; and Si, Stephen S., 4,685,058, Cl. 364-200.000.
Ameling, Dale P.: *See—*
Clark, Ronnie W.; and Ameling, Dale P., 4,684,352, Cl. 445-7.000.
Amerace Corporation: *See—*
Luzzi, Glenn J.; and Kominiak, Andrew A., 4,684,764, Cl. 174-91.000.
American Cyanamid Company: *See—*
Foley, Henry C.; and O'Toole, Michael P., 4,684,618, Cl. 502-313.000.
Wright, William B., Jr.; and Tomcufcik, Andrew S., 4,684,654, Cl. 514-259.000.
American Hospital Supply Corporation: *See—*
Ari, Suha V.; and Lieber, Glen L., 4,684,363, Cl. 604-98.000.
Davenport, James M., 4,684,014, Cl. 206-5.100.
Sutherland, Karl M., 4,684,508, Cl. 422-46.000.
American Standard Inc.: *See—*
Bierkamp, James A.; Hall, Scott D.; and Smith, Wade W., 4,683,942, Cl. 165-53.000.
Kanjo, Wajih, 4,683,991, Cl. 188-197.000.
Sanders, Walter J., 4,685,052, Cl. 364-426.000.
American Telephone and Telegraph Company: *See—*
Becraft, Arthur D.; Citron, Howard M.; and Tatarski, Joseph E., 4,684,198, Cl. 439-571.000.
Hsia, Richard Y.; and Liu, Thomas C., 4,685,123, Cl. 379-93.000.
Zave, Derek A., 4,685,125, Cl. 379-96.000.
American Telephone and Telegraph Company, AT&T Bell Laboratories: *See—*
Ackerman, David A.; Camarda, Renato M.; Hartman, Robert L.; and Spector, Magaly, 4,684,883, Cl. 324-71.500.
Anderson, Jerry M.; Cannon, Thomas C., Jr.; Darden, Bruce V.; and Smith, Donald T., 4,684,195, Cl. 439-404.000.
Bowman, Wayne C.; Magalhaes, Frank M.; Suiter, Weyman B.; and Ziesse, Norman G., 4,685,041, Cl. 363-40.000.
Gavrilovich, Charles D., 4,685,129, Cl. 379-324.000.
Payne, Richard S., 4,684,971, Cl. 357-42.000.
American Television & Communications Corporation: *See—*
Rast, Robert M.; and Wreford-Howard, David, 4,684,980, Cl. 358-86.000.
American Tourister, Inc.: *See—*
Wickman, John A.; and Killian, John J., III, 4,683,731, Cl. 70-69.000.
Ametek, Inc.: *See—*
Kline, Leonard J., Jr.; and Forsyth, Thomas C., III, 4,684,835, Cl. 310-59.000.
Amici, Francesco: *See—*
Brugnoli, Vincenzo, 4,683,907, Cl. 137-414.000.
Amoco Corporation: *See—*
Robeson, Lloyd M., 4,684,699, Cl. 525-471.000.
AMP Incorporated: *See—*
Capp, Randolph E., 4,684,200, Cl. 439-387.000.
Egner, Walter A.; and Collins, Daniel R., 4,684,161, Cl. 294-1.100.
Feher, Michael S.; Weidler, Charles H.; and Wise, James H., 4,684,191, Cl. 439-246.000.
Grabbe, Dimitry G.; and Korsunsky, Iosif, 4,684,184, Cl. 439-64.000.
Long, William B.; Over, Gary L.; Shaffer, Howard R.; and Shuey, John R., 4,684,192, Cl. 439-374.000.
Rudy, William J., Jr.; and Wycheck, Thomas H., 4,684,187, Cl. 439-600.000.
Weber, Robert N.; and Stape, William J., 4,684,211, Cl. 350-96.200.
Ampex Corporation: *See—*
Baranski, Antoni S., 4,685,016, Cl. 360-132.000.
Oxley, Leslie J., 4,684,990, Cl. 358-183.000.
Analog Devices, Inc.: *See—*
Minogue, Paschal, 4,684,922, Cl. 340-347.0DA.
Andersen Manufacturing, Inc.: *See—*
Andersen, Robert L.; and Andersen, Richie D., 4,684,129, Cl. 273-1.50R.
Andersen, Richie D.: *See—*
Andersen, Robert L.; and Andersen, Richie D., 4,684,129, Cl. 273-1.50R.
Andersen, Robert L.; and Andersen, Richie D., to Andersen Manufacturing, Inc. Basketball standard and adjustable support strut therefor. 4,684,129, Cl. 273-1.50R.
Anderson, Arthur A.: *See—*
Pillage, Lawrence T.; and Anderson, Arthur A., 4,683,989, Cl. 187-121.000.
Anderson, Gary S.: *See—*
Rudy, Michael; Cary, Paul; Anderson, Gary S.; and Roth, Arthur A., 4,685,095, Cl. 369-36.000.
Anderson, Jerry M.; Cannon, Thomas C., Jr.; Darden, Bruce V.; and Smith, Donald T., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Solderless electrical connector. 4,684,195, Cl. 439-404.000.
Anderson, John P., to Hartwell Corporation. Slide hinge. 4,683,614, Cl. 16-362.000.
Anderson, Lloyd E.; and Anderson, Martin L. Cutting blade for carpet removing machines. 4,683,657, Cl. 30-170.000.
Anderson, Martin L.: *See—*
Anderson, Lloyd E.; and Anderson, Martin L., 4,683,657, Cl. 30-170.000.
Anderson, Richard T. Strap assembly for securing and transporting mail. 4,684,163, Cl. 294-149.000.
Andersson, Lars; Glanvall, Rune; Ericson, Kjell; and Lundberg, Anders, to Stal Refrigeration AB. Drive for rotary compressor. 4,684,330, Cl. 417-360.000.
Andersson, Susanne; Gustafsson, Jan-Erik; Herngren, Torbjorn; and Carlsson, Staffan, to Svenska Traforskningsinstitutet; Sodra Skogsagarna AB—Monsteras Bruk; and ASEA Aktiebolag. Control of a black liquor recovery boiler. 4,683,841, Cl. 122-22.000.
Ando, Hideo; and Doi, Akihiko, to Kabushiki Kaisha Toshiba. Optical system and method for reducing vibration of an objective lens in an optical head assembly of an optical read/write system. 4,684,797, Cl. 250-201.000.
Andoh, Naoki: *See—*
Fujiwara, Shuetsu; Andoh, Naoki; and Hosotani, Kenji, 4,684,738, Cl. 549-242.000.
Andorfer, Hermann: *See—*
Hahn, Reinhard; and Andorfer, Hermann, 4,684,506, Cl. 420-552.000.
Andors, Derik K.: *See—*
Ferguson, Robert W.; Andors, Derik K.; and Reed, E. Smith, Jr., 4,683,868, Cl. 126-193.000.
Andreas Stihl: *See—*
Schurr, Volker, 4,683,660, Cl. 30-382.000.
Angadjivand, Seyed A.: *See—*
Jackson, John; and Angadjivand, Seyed A., 4,684,481, Cl. 252-510.000.
Anger, Byron H.: *See—*
Takeuchi, Seiji; and Anger, Byron H., 4,684,026, Cl. 206-522.000.
Anger, Wilhelm. Temple end piece for a temple of a spectacle frame. 4,684,226, Cl. 351-123.000.
Angott, Paul G. Lamp dimmer circuit. 4,684,822, Cl. 307-125.000.
Anno, Nobuo: *See—*
Arai, Takeo; Anno, Nobuo; Kinoshita, Yusuke; and Kusakabe, Yukio, 4,683,844, Cl. 123-41.740.
Ansari, Zahid: *See—*
Tsui, Cyrus; Chan, Andrew K. L.; Chan, Albert; Fitzpatrick, Mark E.; and Ansari, Zahid, 4,684,830, Cl. 307-465.000.
Anselment, Christoph: *See—*
Sackmann, Karl H.; and Anselment, Christoph, 4,684,768, Cl. 200-61.430.
ANT Nachrichtentechnik GmbH: *See—*
Ohms, Franz, 4,684,827, Cl. 307-413.000.
Antes, Gregor; Halder, Mathis; Fuchs, Paul; and Gehr, Peter, to LGZ Landis & Gyr Zug AG. System for the display and scanning of the contents of a counter equipped with counting wheels. 4,685,138, Cl. 382-12.000.
Anton Piller GmbH & Co. KG: *See—*
Sachs, Klaus, 4,684,825, Cl. 307-328.000.
Antonio, Joseph M.: *See—*
Armer, Leon N., Jr.; Antonio, Joseph M.; Roth, Craig A.; and VerWeire, James R., 4,684,137, Cl. 273-428.000.
Antoszewski, Richard S.; and Soroka, Daniel P., to Westinghouse Electric Corp. Robotic wrist. 4,684,312, Cl. 414-735.000.
Aoki, Matsuyuki: *See—*
Inoue, Yoshio; and Aoki, Matsuyuki, 4,684,236, Cl. 355-3.0DD.
Appelbaum, Matthew A.; Lehman, David B.; Nieglos, Donald J.; Nolte, Stanley C.; and Oehler, Michael P., to Burroughs Corporation. System for preventing software piracy employing multi-encrypted keys and single decryption circuit modules. 4,683,968, Cl. 380-4.000.
Applied Micro Circuits Corporation: *See—*
Kruest, James R., 4,684,831, Cl. 307-475.000.
Arahira, Masato: *See—*
Osugi, Katsuhisa; Ichinose, Isao; Takahashi, Eisaku; and Arahira, Masato, 4,684,664, Cl. 514-475.000.
Arai, Takao: *See—*
Takahashi, Hiroaki; Kobayashi, Masaharu; Noguchi, Takaharu; Shibuya, Toshifumi; and Arai, Takao, 4,685,004, Cl. 360-32.000.

Arai, Takeo; Anno, Nobuo; Kinoshita, Yusuke; and Kusakabe, Yukio, to Honda Giken Kogyo Kabushiki Kaisha. Cylinder block and head assembly for internal combustion engines. 4,683,844, Cl. 123-41.740.

Arai, Yoshinori: *See*—
Miyaji, Kenichi; Toida, Shouji; and Arai, Yoshinori, 4,684,057, Cl. 228-187.000.

Arapova, Anna V.: *See*—
Akopov, Ernest M.; Schitinin, Valery E.; and Arapova, Anna V., 4,684,051, Cl. 227-19.000.

Archenholtz, Ake; and Folgero, Kare, to ASEA Aktiebolag. Melt-transfer device for the protected tapping of molten metal from one vessel to another. 4,684,109, Cl. 266-216.000.

Argabright, Perry A.: *See*—
Sydansk, Robert D.; and Argabright, Perry A., 4,683,949, Cl. 166-270.000.

Ari, Suha V.; and Lieber, Glen L., to American Hospital Supply Corporation. Rapidly inflatable balloon catheter and method. 4,684,363, Cl. 604-98.000.

Ariyoshi, Yasuo: *See*—
Takemoto, Tadashi; and Ariyoshi, Yasuo, 4,684,745, Cl. 560-41.000.

Armer, John, to RCA Corporation. Ripple-borrow binary subtraction circuit. 4,685,079, Cl. 364-784.000.

Armer, Leon N., Jr.; Antonio, Joseph M.; Roth, Craig A.; and VerWeire, James R. Simulated war game weapon. 4,684,137, Cl. 273-428.000.

Armstrong, Ennels D. Anti-theft device. 4,683,737, Cl. 70-253.000.

Arnett, Richard K., to General Motors Corporation. Solder fluxing method and apparatus. 4,684,544, Cl. 427-96.000.

Arney, Michel D.; and LaCount, Clifford E., to Wang Laboratories, Inc. Apparatus for attaching cable to a keyboard. 4,684,185, Cl. 439-502.000.

Arnold, Hubert E., to Rolls-Royce plc. Turbomachine rotor blade fixings and method for assembly. 4,684,325, Cl. 416-215.000.

Arnold, Werner; Grasser, Hans; Kruger, Tilmann; and Meisner, Alfred, to Diehl GmbH & Co. Method for entering a switching program into an electronic timer and arrangement for implementing the method. 4,684,261, Cl. 368-107.000.

Arquati, Ettore. Motor-driven curtain operating unit. 4,683,935, Cl. 160-331.000.

Arques, Marc, to Thomson-CSF. Base clipping process for a solid state photosensitive device. 4,685,117, Cl. 377-60.000.

Artz, Klaus; Meyer, Hans R.; Reinehr, Dieter; and Weber, Kurt, to Ciga-Geiby Corporation. Stilbene derivatives. 4,684,744, Cl. 558-388.000.

Asagi, Yasuyoshi: *See*—
Hattori, Toshihiro; Uchiyama, Nobuichi; Asagi, Yasuyoshi; Ogawa, Noriaki; and Kasai, Hitoshi, 4,683,996, Cl. 192-0.033.

Asahi Chemical Research Laboratory Co., Ltd.: *See*—
Iwasa, Yamahiro, 4,683,653, Cl. 29-830.000.
Iwasa, Yamahiro; Kabe, Atsushi; and Oba, Yoichi, 4,684,054, Cl. 228-180.100.

Asahi Denka Kogyo K.K.: *See*—
Tsuchiya, Hiroshi; Morio, Kazuhiko; Murase, Hisashi; and Ohkawa, Kazuo, 4,684,671, Cl. 522-31.000.

Asakura, Masahiko: *See*—
Shimamura, Haruo; Kobayashi, Hideo; and Asakura, Masahiko, 4,683,860, Cl. 123-492.000.

Asari, Akira; Yamamura, Takashige; Hattori, Shigeo; and Ueno, Tsuneya, to Kabushiki Kaisha Kobe Seiko Sho. Method for manufacturing an integrated wheel. 4,683,630, Cl. 29-159.010.

Ascii Corporation: *See*—
Nishi, Kazuhiko; Ishii, Takatoshi; Yamashita, Ryozo; Yamaoka, Shigemitsu; and Okumura, Takatoshi, 4,684,942, Cl. 340-703.000.

ASEA Aktiebolag: *See*—
Andersson, Susanne; Gustafsson, Jan-Erik; Herngren, Torbjorn; and Carlsson, Staffan, 4,683,841, Cl. 122-22.000.
Archenholtz, Ake; and Folgero, Kare, 4,684,109, Cl. 266-216.000.

Asgalium S.A.: *See*—
Heyraud, Marc A.; and Kureth, Jean-Bernard, 4,684,860, Cl. 318-696.000.

Ashitaka, Hidetomo; Jinda, Kazuya; and Miwa, Yoshiyuki, to UBE Industries, Ltd. Preparation of azo compounds having carboxyl and cyano groups. 4,684,717, Cl. 534-586.000.

Ashitaka, Hidetomo; Jinda, Kazuya; and Miwa, Yoshiyuki, to UBE Industries, Ltd. Process for the preparation of diazocyano acids by reacting keto-acids with cyanogen compounds. 4,684,718, Cl. 534-586.000.

AT&T Information Systems Inc.: *See*—
Becraft, Arthur D.; Citron, Howard M.; and Tatarski, Joseph E., 4,684,198, Cl. 439-571.000.
Hsia, Richard Y.; and Liu, Thomas C., 4,685,123, Cl. 379-93.000.

Ateliers de Constructions Electriques de Charleroi: *See*—
De Baere, Luc, 4,684,468, Cl. 210-603.000.

Athey, Wilber J. Curtain rod and window shade holder. 4,684,095, Cl. 248-255.000.

Athy, Dale A. Camera filter adaptor system. 4,684,231, Cl. 354-295.000.

Atkinson, Roger: *See*—
Miller, Arthur O.; Coleman, Hollis; Atkinson, Roger; and Dorsey, Boyd, 4,685,127, Cl. 379-221.000.

Atlantic Richfield Company: *See*—
Fleming, Graham C., 4,683,948, Cl. 166-263.000.
Pathak, Prabodh; and Salter, Stephen J., 4,683,951, Cl. 166-271.000.
Skinner, James L., 4,683,963, Cl. 175-66.000.
Younes, Usama E., 4,684,692, Cl. 524-548.000.

Atlas Copco Aktiebolag: *See*—
Schoeps, Knut C., 4,683,961, Cl. 173-93.000.

Atwal, Karnail, to E. R. Squibb & Sons, Inc. 1,2,3,4-tetrahydro-6-substituted-4-aryl-3-substituted-2-thioxo(or oxo)-5-pyrimidinecarboxylic acids and esters and use thereof to lower blood pressure. 4,684,655, Cl. 514-274.000.

Atwal, Karnail, to E. R. Squibb & Sons, Inc. 1,2,3,4-tetrahydro-6-substituted-4-aryl-3-(substituted sulfonyl)-2-thioxo(or oxo)-5-pyrimidinecarboxylic acids and esters and method of using them to lower blood pressure. 4,684,656, Cl. 514-274.000.

Aubert, Lucien P.: *See*—
Marissal, Jeanine; and Aubert, Lucien P., 4,684,522, Cl. 424-195.100.

Audi AG: *See*—
Bauder, Armin, 4,683,850, Cl. 123-195.00C.

Augason, Gordon C., to United States of America, National Aeronautics and Space Administration. Method and apparatus for making an optical element having a dielectric film. 4,684,424, Cl. 156-163.000.

Auger, Marc, to Centre Technique des Industries Mecaniques. Method and device for controlling the acceleration of an electric stepping motor. 4,684,865, Cl. 318-696.000.

Augustyniak, George E. Filtration, aeration, and water level control means for aquariums. 4,684,462, Cl. 210-97.000.

Aurich, John P. Containment system. 4,683,762, Cl. 73-863.580.

Ausimont S.p.A.: *See*—
Marchionni, Giuseppe; Tonelli, Claudio; and Nicoletti, Alberto, 4,684,452, Cl. 204-157.940.

Automobiles Citroen: *See*—
Miclot, Andre L., 4,684,158, Cl. 292-76.000.

Automobiles Peugeot: *See*—
Miclot, Andre L., 4,684,158, Cl. 292-76.000.

Automotive Products plc: *See*—
Caracini, Pietro; and Cucinotta, Luigi, 4,684,006, Cl. 192-106.200.
Leigh-Monstevens, Keith V., 4,684,003, Cl. 192-85.0CA.

Autotrol Corporation: *See*—
Goudy, Paul R., Jr., 4,684,063, Cl. 239-2.100.
Goudy, Paul R., Jr., 4,684,254, Cl. 366-340.000.

Avidan, Amos A.; Krambeck, Frederick J.; and Tabak, Samuel A., to Mobil Oil Corporation. Process for converting methanol to alkyl ethers, gasoline, distillate and alkylate liquid hydrocarbons. 4,684,757, Cl. 585-331.000.

Avila, Gerardo; and Cerez, Pierre, to Compagnie d'Electronique et de Piezo - Electricite C.E.P.E. Optical pumping cesium resonator and laser diode detection. 4,684,900, Cl. 331-3.000.

Awaga, Makoto: *See*—
Fujisaku, Kiminori; Awaga, Makoto; and Mori, Shosuke, 4,684,935, Cl. 340-717.000.

Awashima, Masaru: *See*—
Kaieda, Osamu; Awashima, Masaru; Okitaka, Isao; and Nakamura, Toshiaki, 4,684,734, Cl. 546-345.000.

Azegami, Tadashi: *See*—
Hirata, Terutaka; Azegami, Tadashi; Kimura, Atsushi; and Katayama, Megumi, 4,683,754, Cl. 73-708.000.

Azmi, Kaya: *See*—
Johnson, Ralph K.; Azmi, Kaya; Keyes, Marion A., IV; and Moss, William H., 4,685,072, Cl. 364-551.000.

B. F. Goodrich Company, The: *See*—
Hawrylko, Roman B., 4,684,668, Cl. 521-56.000.

Baba, Hidetsuyo: *See*—
Tsuzurahara, Mamoru; Baba, Hidetsuyo; and Kitakaze, Seiji, 4,684,845, Cl. 313-341.000.

Baba, Mitsushige: *See*—
Abe, Katsuhiro; Kobayashi, Yoshinobu; and Baba, Mitsushige, 4,684,684, Cl. 524-227.000.

Babcock & Wilcox Company, The: *See*—
Johnson, Ralph K.; Azmi, Kaya; Keyes, Marion A., IV; and Moss, William H., 4,685,072, Cl. 364-551.000.

Bach, Hanswilhelm: *See*—
Kessen, Gunther; Cornils, Boy; Gick, Wilhelm; Wiebus, Ernst; Hibbel, Joseph; Bach, Hanswilhelm; and Zgorzelski, Wolfgang, 4,684,750, Cl. 568-883.000.

Baer, Michael T., to Spectra-Physics, Inc. Phase stabilization for mode locked lasers. 4,685,111, Cl. 372-18.000.

Baer, Scott D.; and Glenn, Thomas P., to Harris Corporation. Method of selectively soldering the underside of a substrate having leads. 4,684,055, Cl. 228-180.100.

Baer, Thomas M.: *See*—
Kafka, James D.; Baer, Thomas M.; and Head, David F., 4,685,107, Cl. 372-6.000.

Bagwell, Maury L., to Neal Manufacturing Company, Inc. Pumping system for mobile protective coating spray apparatus and other applications. 4,684,062, Cl. 239-1.000.

Baker, Gerald G., to Murphy, Chester M., a part interest. Ladder leveler apparatus. 4,683,982, Cl. 182-204.000.

Baker, Gerald G.: *See*—
Murphy, Chester M., 4,683,983, Cl. 182-204.000.

Balance Dynamics Co.: *See*—
Kerlin, Jack H., 4,684,944, Cl. 340-825.060.

Baldasarri, Mario: *See*—
Van Driesen, Roger P.; Adams, William R.; Caspers, John; Baldasarri, Mario; and Trimble, Harold, 4,684,456, Cl. 208-143.000.

Baldridge, Morris G.: *See*—
Stepp, Lee W.; Baldridge, Morris G.; and Treece, Harold O., 4,683,955, Cl. 166-327.000.

Bales, Emmett R.; and Huff, George L., to Meco Corporation. Charcoal cooker. 4,683,866, Cl. 126-25.00B.

Ball Corporation: *See*—
Edwards, Carson P.; Huisjen, Martin A.; and Munson, Robert E., 4,684,929, Cl. 340-541.000.
Munson, Robert E.; Haddad, Hussain A.; and Hanlen, John W., 4,684,952, Cl. 343-700.0MS.
Ball, Jeffrey M., to Willett International Limited. Method for applying a hot melt ink to a substrate. 4,684,956, Cl. 346-1.100.
Balogh, Francis, to Star Headlight & Lantern Company, Inc. Flash lamp circuit. 4,684,852, Cl. 315-241.00R.
Balter, Valentin, to Huntington Mechanical Laboratories, Inc. Rotary motion feed-through apparatus. 4,683,763, Cl. 74-18.100.
Baltzer, Erich, to Hergeth Hollingsworth GmbH. Apparatus for the production of short warps especially for cloth designs in multicolor weaving. 4,683,625, Cl. 28-191.000.
Bandai, Yasuhito: *See*—
Sakakibara, Kenji; Harano, Tetsuo; Bandai, Yasuhito; and Ohta, Eiichi, 4,684,999, Cl. 358-294.000.
Bannister, Brian C. Method of making cloth covered panels having edging strips. 4,684,425, Cl. 156-216.000.
Bannister, Richard: *See*—
Dayton, Birney D.; and Bannister, Richard, 4,684,823, Cl. 307-247.00R.
Baraban, Viktor P.; Zabrovsky, Stanislav G.; Zvyagin, Albert F.; Lazarev, Grigory B.; and Tars, Yaak A., to P/O Tallinsky Electrotekhnichesky Zavod. Device for failure detection in series-connected semiconductor rectifiers. 4,685,045, Cl. 363-68.000.
Barabas, Eugene S., to GAF Corporation. Method of preparing a polyvinylpyrrolidone-halogen complex of improved stability. 4,684,519, Cl. 424-80.000.
Barabas, Eugene S., to GAF Corporation. Water soluble multicomplex of chlorothiazide, furosemide and poly(N-vinyl-2-pyrrolidone). 4,684,698, Cl. 525-326.900.
Baranski, Antoni S., to Ampex Corporation. Door operating mechanism for a cassette usable in a magnetic tape recorder. 4,685,016, Cl. 360-132.000.
Barclay Horticulture Mfg. Ltd.: *See*—
Faul, Thomas L., 4,683,674, Cl. 47-83.000.
Bargiotti, Alberto; Caruso, Michele; Suarato, Antonino; Penco, Sergio; and Giuliani, Fernando, to Farmitalia Carlo Erba S.p.A. 3'-deamino-3'-hydroxy-4'-deoxy-4'-amino doxorubicin and related daunorubicin. 4,684,629, Cl. 514-34.000.
Barnsdale, William J., Jr.; and Ford, Frank G., to Pueblo Technologies, Inc. Computer security device. 4,685,056, Cl. 364-200.000.
Barrere, Genevieve C.; Beydon, Marie-Helene; Drugeault, Lionel; and Vasseur, Jean-Pierre, to Rhone-Poulenc Sante. Device for carrying out withdrawals of samples from semi-solid media. 4,684,613, Cl. 435-301.000.
Barrett, Garret D. Stents for bone augmentation by surgical implant. 4,684,370, Cl. 623-66.000.
Barrett, Harold J., to Eastman Kodak Company. Inhibition of exposure in a video printer upon loss of color filter sync. 4,685,000, Cl. 358-332.000.
Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., to Caterpillar Inc. Heat recovery system including a dual pressure turbine. 4,684,321, Cl. 415-202.000.
Barron, Edward J., to Rejs Co., Inc. Refrigeration apparatus. 4,683,726, Cl. 62-503.000.
Barry, Robert F.: *See*—
Wilson, John F.; and Barry, Robert F., 4,684,496, Cl. 376-352.000.
Bartasevich, William E., Jr.: *See*—
Lackner, John R.; and Bartasevich, William E., Jr., 4,683,607, Cl. 15-323.000.
Bartholomew, Donald D., to Proprietary Technology, Inc. Flexible pressure-confining conduit assembly. 4,683,917, Cl. 138-121.000.
Bartley, Francis A.: *See*—
Goodbary, Edgar R.; and Bartley, Francis A., 4,684,152, Cl. 280-785.000.
BASF Aktiengesellschaft: *See*—
Gramlich, Walter; Halbritter, Klaus; and Heilen, Gerd, 4,684,743, Cl. 558-374.000.
Kraus, Friedrich; Matthias, Guenther; Wittmann, Otto; and Diem, Hans, 4,684,690, Cl. 524-419.000.
Rentzea, Costin; Sauter, Hubert; Zeeh, Bernd; Heilen, Gerd; and Jung, Johann, 4,684,392, Cl. 71-76.000.
BASF Farben & Fasern AG: *See*—
Diefenbach, Horst; Dobbelstein, Arnold; and Hille, Hans-Dieter, 4,684,676, Cl. 523-411.000.
Basic Packaging Systems, Inc.: *See*—
Titchenal, Oliver R., 4,685,148, Cl. 383-37.000.
Bateman, Charles D., to Sundstrand Data Control, Inc. Ground proximity warning system having modified terrain closure rate warning on glide slope approach. 4,684,948, Cl. 340-970.000.
Bates, Donald L., to Eldon Industries, Inc. Demountable signboards. 4,683,670, Cl. 40-620.000.
Bates, Gary M.; Haaf, William R.; and Ting, Sai-Pei, to General Electric Company. Impact modified polyphenylene compositions. 4,684,696, Cl. 525-68.000.
Batson, David C.; and Goebel, Franz, to GTE Government Systems Corporation. Electrochemical cell with disc activator. 4,684,587, Cl. 429-115.000.
Batson, David C.: *See*—
Goebel, Franz; and Batson, David C., 4,684,588, Cl. 429-115.000.
Haskins, Timothy B.; Goebel, Franz; Batson, David C.; and Zuffante, Charles R., 4,684,586, Cl. 429-115.000.
Battelle Development Corporation: *See*—
Zega, Bogdan, 4,684,536, Cl. 427-47.000.
Bauder, Armin, to Audi AG. Oil sumps for internal combustion engines. 4,683,850, Cl. 123-195.00C.
Baudry, Hugues, to U.S. Philips Corporation. Starting mixture for an insulating composition comprising a lead glass, silk-screening ink comprising such a mixture, and the use of said ink for the protection of hybrid microcircuits on ceramic substrates. 4,684,543, Cl. 427-96.000.
Baudry, Hugues: *See*—
Duchenois, Valere; Fouassier, Michele; and Baudry, Hugues, 4,684,846, Cl. 313-475.000.
Bauer, Francois, to Deutsch-Franzosisches Forschungsinstitut Saint-Louis. Device for polarizing ferroelectric materials. 4,684,337, Cl. 425-135.000.
Baumann, Hans D. Lever-amplified actuating means for valves and other devices. 4,684,103, Cl. 251-58.000.
Baumeister, Hans P., to Eastman Kodak Company. Simultaneous exposure/focus control in a video camera using a solid state image sensor. 4,684,995, Cl. 358-227.000.
Baumeister, Hans-Peter, to Eastman Kodak Company. Video projector with optical feedback. 4,684,996, Cl. 358-231.000.
Baumer, Hans. Process and apparatus for monitoring weather phenomena. 4,684,951, Cl. 342-362.000.
Bausch & Lomb Incorporated: *See*—
Clark, James A.; and Dobner, Michael H., 4,684,225, Cl. 350-518.000.
Bawcutt, Anthony J.: *See*—
Deveson, Daniel A.; and Bawcutt, Anthony J., 4,685,122, Cl. 379-90.000.
Bayer Aktiengesellschaft: *See*—
Darsow, Gerhard; and Biedermann, Wolfgang, 4,684,720, Cl. 536-124.000.
Meyer, Rolf-Volker; Fahnler, Friedrich; Dhein, Rolf; and Michael, Dietrich, 4,684,746, Cl. 564-38.000.
Mohring, Edgar; Muller, Hanns P.; Roessler, Peter; Wagner, Kuno; and Tietz, Helmut, 4,684,728, Cl. 544-182.000.
Stahl, Hans G.; Hohlein, Peter; Traenckner, Hans-Joachim; Fleiter, Lothar; and Schwindt, Jurgen, 4,684,691, Cl. 524-534.000.
Bayerische Motoren Werke AG: *See*—
Cigdem, Saffet; Lichnofsky, Rudiger; and Martin, Harry, 4,683,998, Cl. 192-58.00C.
Weishaupt, Walter, 4,684,896, Cl. 324-399.000.
Bazzi, Giuseppe B.: *See*—
Valsecchi, Carlo; Piatti, Franco; and Bazzi, Giuseppe B., 4,683,620, Cl. 24-71.0SK.
BBC Brown, Boveri & Company, Limited: *See*—
Niemeyer, Lutz, 4,684,773, Cl. 200-148.00R.
Beale, Harry A. Glass having controllable infrared transmission. 4,684,575, Cl. 428-434.000.
Beardsley, George P.: *See*—
Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J.; and Fletcher, Stephen R., 4,684,653, Cl. 514-258.000.
Beattie, Patrick J., to John D. Brush & Co., Inc. Live bolt assembly for safe door. 4,683,732, Cl. 70-118.000.
Beatty, Theodore J. Barbecue grill. 4,683,867, Cl. 126-41.00R.
Beck, Lawrence R.; Kocjan, Andrew J.; Natoli, Richard A.; and Liguore, Louis J., to General Motors Corporation. Bus assembly and method of making same. 4,684,765, Cl. 174-68.500.
Beck, Willi K.; Danielson, Lincoln V.; and Strange, Andrew, to Joseph Pollak Corporation. Manual clutch switching system. 4,684,769, Cl. 200-61.890.
Becker, Charles E. Motor vehicle sun screen apparatus. 4,684,165, Cl. 296-136.000.
Beckman, Joseph A.: *See*—
Bryant, Lynn A.; Roberts, Durward T., Jr.; Beckman, Joseph A.; Tazewell, Joseph H.; and Cetnar, James F., 4,684,420, Cl. 156-116.000.
Beckmann, Georg: *See*—
Hillinger, Bruno; and Beckmann, Georg, 4,684,374, Cl. 48-197.00R.
Becraft, Arthur D.; Citron, Howard M.; and Tatarski, Joseph E., to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Modular cable interconnection apparatus. 4,684,198, Cl. 439-571.000.
Bednorz, Johannes G.; Denk, Winfried; Lanz, Martin; and Pohl, Wolfgang D., to International Business Machines Corporation. Light waveguide with a submicron aperture, method for manufacturing the waveguide and application of the waveguide in an optical memory. 4,684,206, Cl. 350-96.120.
Beecham Group: *See*—
Burton, George; and Best, Desmond J., 4,684,639, Cl. 514-194.000.
Beger, Udo, to Gotz, Kurt. Folding child's bed. 4,683,600, Cl. 5-99.00C.
Bell, Malcolm R.: *See*—
Christiansen, Robert G.; Bell, Malcolm R.; Herrmann, John L., Jr.; and Opalka, Chester J., Jr., 4,684,636, Cl. 514-176.000.
Bell, Robert L., to Fisher Dynamics Corporation. Quick release mechanism for gear operated seat recliner. 4,684,174, Cl. 297-367.000.
Bell Telephone Laboratories, Incorporated: *See*—
Zave, Derek A., 4,685,125, Cl. 379-96.000.
Bell, Theodore F., Sr. Index tables. 4,684,114, Cl. 269-57.000.
Bellucci, George N.: *See*—
Harrison, David M.; Gentili, Robert P.; and Bellucci, George N., 4,683,922, Cl. 141-9.000.
Ben Clements & Sons, Inc.: *See*—
Furutsu, Akira, 4,683,920, Cl. 140-93.00A.
Bender, Albert, to Maschinenfabrik Gehring Gesellschaft mit beschrankter Haftung & Co. Kommanditgesellschaft. Method and appa-

ratus for producing bores having a high surface quality. 4,683,680, Cl. 51-34.00J.

Bennett, Steven L.: *See*—
Bishop, F. Avery; and Bennett, Steven L., 4,685,132, Cl. 380-46.000.

Benson, Raymond G., Jr.: *See*—
George, David L.; and Benson, Raymond G., Jr., 4,684,870, Cl. 320-20.000.

Benson, Richard A.; and Alden, David H., to MKS Instruments, Inc. High-speed protective check valving for pressure transducers and the like. 4,683,910, Cl. 137-519.000.

Bentvelzen, Joseph M.: *See*—
Meredith, Michael D.; Bentvelzen, Joseph M.; and Jordan, Marvin F., 4,684,442, Cl. 162-242.000.

Berberich, Bernd, to TAMPOflex GmbH. Process for multi-color ink tampon printing. 4,683,821, Cl. 101-170.000.

Berfield, Robert C.; and Meland, Ronald F., to Shop-Vac Corporation. Alternate blower outlet for vacuum cleaner. 4,683,608, Cl. 15-328.000.

Bergagnini, Sergio. Panel fence. 4,684,108, Cl. 256-24.000.

Berger, Jean-Luc; Brissot, Louis; and Cazaux, Yvon, to Thomson-CSF. Analysis process of a line transfer photosensitive device and operating device of such a process. 4,684,993, Cl. 358-213.310.

Berggren, Torsten L., to Thune-Eureka A/S. Apparatus for thickening and refining fibre-pulp suspensions. 4,684,073, Cl. 241-247.000.

Bergman, Frederick S.; and Radelet, Reginald P., to Bergman, Frederick Sigurdur. Material hoisting gin. 4,684,031, Cl. 212-179.000.

Bergman, Frederick Sigurdur: *See*—
Bergman, Frederick S.; and Radelet, Reginald P., 4,684,031, Cl. 212-179.000.

Bergman, Roger M.; and Mosheim, Charles E., to Cabot Corporation. Tantalum powder process. 4,684,399, Cl. 75-0.5BB.

Bergsmann Apparatebau Gesellschaft m.b.H. & Co. KG.: *See*—
Kronawittleithner, Kurt; and Pfarrsbacher, Alfred, 4,683,788, Cl. 82-47.000.

Berkey, George E., to Corning Glass Works. Conveyor deposition method and apparatus for making optical fiber preforms. 4,684,384, Cl. 65-3.120.

Berkowitz, Nathan L. Flush combination lock. 4,683,738, Cl. 70-332.000.

Berlinger, Gregory J.; and Speranza, Joseph J., to General Motors Corporation. Laser welding metal sheets with associated trapped gases. 4,684,779, Cl. 219-121.0LD.

Berman, Jody R.: *See*—
Wang, Chun S.; Chen, Wuu N.; Bowden, Robert L.; and Berman, Jody R., 4,684,700, Cl. 525-481.000.

Bernath, Tibor. Apparatus for measuring gas concentrations in a hot gas sample withdrawn from a process chamber. 4,684,509, Cl. 422-54.000.

Bertelli, Alberto, to Seuref A.G. Pharmaceutical compositions having cerebral antianoxic and metabolic activities. 4,684,520, Cl. 424-94.100.

Bertram, Leo; and Schemmann, Hugo, to U.S. Philips Corporation. Synchronous motor having a permanent-magnet modular rotor. 4,684,840, Cl. 310-162.000.

Berwick, James W., Jr.; and Thomason, Gary C., to Boeing Company, The. Aircraft automatic trim system. 4,684,085, Cl. 244-178.000.

Best, Desmond J.: *See*—
Burton, George; and Best, Desmond J., 4,684,639, Cl. 514-194.000.

Bethlehem Steel Corporation: *See*—
Moskowitz, I., 4,683,825, Cl. 105-148.000.

Bettenga, James L.: *See*—
Cohen, Mordehy; Bettenga, James L.; and Tjenstrom, Brian, 4,683,984, Cl. 184-6.200.

Beurskens, Theodorus J. G.: *See*—
Scholten, Gerard J.; Beurskens, Theodorus J. G.; and Videc, Mathias F., 4,683,654, Cl. 29-832.000.

Beydon, Marie-Helene: *See*—
Barrere, Genevieve C.; Beydon, Marie-Helene; Drugeault, Lionel; and Vasseur, Jean-Pierre, 4,684,613, Cl. 435-301.000.

Bezama, Raschid J.; and Perry, Charles H., to International Business Machines Corporation. Gas-loaded pressure diaphragm. 4,684,339, Cl. 425-389.000.

Bhutani, Baldev R., to Alra Laboratories, Inc. Sustained release tablets and method of making same. 4,684,516, Cl. 424-19.000.

Biedermann, Wolfgang: *See*—
Darsow, Gerhard; and Biedermann, Wolfgang, 4,684,720, Cl. 536-124.000.

Bieger, Walter I.: *See*—
Niebling, Tracy J.; and Bieger, Walter I., 4,684,021, Cl. 206-334.000.

Bierkamp, James A.; Hall, Scott D.; and Smith, Wade W., to American Standard Inc. Assembly for retrofitting two air handling units to an installation originally meant for a single unit. 4,683,942, Cl. 165-53.000.

Bigham, C. Bruce; Burton, Robert J.; and McGregor, James E. A., to Canada, Atomic Energy of, Limited. Sliding electric contacts. 4,684,180, Cl. 439-29.000.

Bihler, Otto. Small-sized contact pin package. 4,684,203, Cl. 439-751.000.

Bird, Charles R.; and Rockett, Paul D., to KMS Fusion, Inc. Movable anode x-ray source with enhanced anode cooling. 4,685,119, Cl. 378-130.000.

Bishop, F. Avery; and Bennett, Steven L., to Sperry Corporation. Bent sequence code generator. 4,685,132, Cl. 380-46.000.

Bissel, Steve F. Waterbed and holder assembly for use therewith. 4,683,602, Cl. 5-451.000.

Bissell, Irving J. Citrus fruit peeler. 4,683,655, Cl. 30-123.700.

Bito, Hiroyasu, to Casio Computer Co., Ltd. Card identification system. 4,684,791, Cl. 235-380.000.

Bittner, Hans-Joachim, to H. Putsch GmbH & Comp. Disc cutter machine, in particular for cutting sugar beet. 4,683,790, Cl. 83-356.300.

Bjorklund, Bjorn, to AB Svenska Flaktfabriken. Apparatus for deicing exterior parts of a railway vehicle. 4,683,870, Cl. 126-271.100.

Black & Decker Inc.: *See*—
Dibbern, John E., Jr.; and Moores, Gregory E., 4,684,774, Cl. 200-275.000.
Ryckman, William D.; and Gordon, Walter H., 4,684,788, Cl. 219-413.000.

Black, James B., to GTE Communication Systems Corporation. Control circuit for a centrex attendant console interface. 4,685,103, Cl. 370-58.000.

Blackburn, William P.: *See*—
Chang, Wen-Hsuan; Blackburn, William P.; Prucnal, Paul J.; and Dufford, Edward L., 4,684,697, Cl. 525-100.000.

Blain, Aurele J. Electrical transformer having a solid core surrounding winding in a loop configuration. 4,684,882, Cl. 323-356.000.

Bliehall, James C., to Diasonics, Inc. NMR surface coil positioning device. 4,684,894, Cl. 324-318.000.

Bliudnikas, Kestutis E., to Alden Research Foundation. Detachable facsimile print head drive. 4,684,961, Cl. 346-139.00A.

Block, Aleck. Abrasive material mounting structure. 4,683,683, Cl. 51-377.000.

Blomstedt, John W.; Yoshida, Paul S.; Irving, Wesley F.; and Roudenko, Vladimir, to Honeywell Information Systems Inc. Integrated backplane. 4,685,032, Cl. 361-412.000.

Blythin, David J.; and Shue, Ho-Jane, to Schering Corporation. Zwitterionic 1,8-naphthyridine and pyrazino[2,3-b]pyridine containing compounds useful as anti-allergic, anti-inflammatory and cycloprotective agents. 4,684,727, Cl. 544-127.000.

Boaz, Premakaran T., to Ford Motor Company. Method of forming a glass sheet with a UV-base ceramic paint thereon. 4,684,388, Cl. 65-24.000.

Boaz, Premakaran T., to Ford Motor Company. Method of forming a glass sheet with an oil-base ceramic paint thereon. 4,684,389, Cl. 65-24.000.

Bock, Jan; Brownawell, Darrell W.; Gutierrez, Antonio; Robbins, Max L.; Shaub, Harold; and Steyn, Peter L., to Exxon Research and Engineering Company. Lubricant oil composition with improved friction reducing properties. 4,684,473, Cl. 252-49.800.

Boebel, Manfred: *See*—
Hutterer, Frieder; Buess, Gerd; and Boebel, Manfred, 4,683,885, Cl. 128-334.00R.

Boeing Company, The: *See*—
Berwick, James W., Jr.; and Thomason, Gary C., 4,684,085, Cl. 244-178.000.
Devaney, Walter E., 4,684,761, Cl. 136-258.000.
Douglas, William A.; and Ozer, Theodore, 4,684,113, Cl. 269-21.000.
Lubowitz, Hyman R.; and Sheppard, Clyde H., 4,684,714, Cl. 528-353.000.
Pinson, George T., 4,684,080, Cl. 244-3.220.

Bogeso, Klaus P., to H. Lundbeck A/S. Antihypertensive fluorophenylindanyl imidazolidinoneethylpiperazines. 4,684,650, Cl. 514-252.000.

Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, to Ciba-Geigy Corporation. Pyrazine-sulfonylcarbamates and thiocarbamates. 4,684,730, Cl. 544-408.000.

Bolden, Paul L., Jr.: *See*—
Hayes, Michael E.; Hrebenar, Kevin R.; Murphy, Patricia L.; Futch, Laurence E., Jr.; Deal, James F., III; and Bolden, Paul L., Jr., 4,684,372, Cl. 44-51.000.

Bonnard, Jean-Louis: *See*—
Peyrot, Jean-Claude; and Bonnard, Jean-Louis, 4,683,656, Cl. 30-162.000.

Bonser, Steven M.; Bugner, Douglas E.; and Demejo, Lawrence P., to Eastman Kodak Company. Electrographic toner and developer composition containing quaternary ammonium salt charge-control agent. 4,684,596, Cl. 430-110.000.

Booth, Thomas L.; Schlaps, Edgar H.; and Wilde, Ronald J., to General Motors Corporation. Vehicle power window control. 4,683,975, Cl. 180-289.000.

Borg-Warner Corporation: *See*—
Mulders, Johannes A., 4,684,318, Cl. 415-113.000.

Bork, Carl R., Jr.: *See*—
Kolenc, Terrence J.; Bork, Carl R., Jr.; Steiss, William C.; Shufflebarger, Earl D.; and Tobbe, William P., 4,684,106, Cl. 251-335.200.

Borrelli, Nicholas F.; and Morse, David L., to Corning Glass Works. Small anamorphic lenses and method. 4,684,222, Cl. 350-420.000.

Bosnyak, Robert J.: *See*—
France, Michael G.; Geannopoulos, George L.; Bosnyak, Robert J.; and Chan, Steve Y., 4,684,826, Cl. 307-272.00A.

Boss, Heinz; and Weber, Walter, to Grapha-Holding AG. Apparatus for temporary storage of printed products between successive processing machines of a production line. 4,684,118, Cl. 270-58.000.

Bossand, Bernard; Eppe, Jacques; Faure, Alain; and Leygue, Gilles, to ELF France. Organic ameliorators protected by a hydrocarbon structure allowing the improvements of soil properties. 4,684,391, Cl. 71-24.000.

Bott, John A. Vehicle article carrier. 4,684,048, Cl. 224-326.000.

Botvidsson, Lars I.: *See*—
Herbst, Ewa; and Botvidsson, Lars I., 4,683,896, Cl. 128-785.000.

Boechal, Robert A. Story telling game. 4,684,135, Cl. 273-269.000.

Bourke, Eleanor F.: *See—*
Edelson, Richard L., 4,683,889, Cl. 128-395.000.
Edelson, Richard L., 4,684,521, Cl. 424-101.000.

Bourke, Frederic A., Jr.: *See—*
Edelson, Richard L., 4,683,889, Cl. 128-395.000.
Edelson, Richard L., 4,684,521, Cl. 424-101.000.

Bourrelly, Paul; Patin, Henri; Schoepp, Robert; and Sanson, Charles, to Commissariat a l'Energie Atomique. Heat flux meter for checking calorigenic materials within a container. 4,684,265, Cl. 374-43.000.

Bowden, Robert L.: *See—*
Wang, Chun S.; Chen, Wuu N.; Bowden, Robert L.; and Berman, Jody R., 4,684,700, Cl. 525-481.000.
Wang, Chun S.; Bowden, Robert L.; and Chen, Wuu N., 4,684,701, Cl. 525-507.000.

Bower, Terry F.; Randlett, M. Ronald; and Shinopulos, George, to Kennecott Corporation. Method and apparatus for the continuous production of strip using oscillating mold assembly. 4,683,938, Cl. 164-413.000.

Bowman, Wayne C.; Magalhaes, Frank M.; Suiter, Weyman B.; and Ziesse, Norman G., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Resonant rectifier circuit. 4,685,041, Cl. 363-40.000.

Box, Jeffrey L.: *See—*
Johnson, Charles B.; Box, Jeffrey L.; and Hildebrand, David B., 4,685,104, Cl. 370-67.000.

Boyle, John T. A., to John Wyeth & Brother Limited. Benzenesulphonamide derivatives. 4,684,657, Cl. 514-313.000.

Bozzelli, Joseph W.: *See—*
Geskin, Ernest S.; and Bozzel'i, Joseph W., 4,684,402, Cl. 75-51.500.

BR Laboratories, Inc.: *See—*
Subherwal, Bodh R., 4,684,061, Cl. 236-20.00R.

Bradley, Charles D., Jr., to Pneumo Abex Corporation. Anti-rotation lock assembly. 4,684,284, Cl. 403-320.000.

Bradshaw, Leslie, to United Kingdom Atomic Energy Authority. Ultrasonic probe. 4,683,752, Cl. 73-642.000.

Bratten, Jack R. Method and apparatus for removing paint overspray. 4,684,378, Cl. 55-96.000.

Brauch, Hans-Joachim: *See—*
Neuhauser, Johannn; and Brauch, Hans-Joachim, 4,683,764, Cl. 74-41.000.

Braun, Warren L.; and Curt, Walter M., to ComSonics, Inc. Portable sampling spectrum analyzer. 4,685,065, Cl. 364-485.000.

Braunschweigische Maschinenbauanstalt Aktiengesellschaft: *See—*
Laske, Gerd; and Valentin, Peter, 4,683,667, Cl. 34-203.000.

Breach, William D.; and Vaclavik, Edwin W., to Hydril Company. Chemical and heat resistant rubber composition. 4,684,687, Cl. 524-291.000.

Break, Douglas, to Ridgetown Ltd. Attachment for a vertical mill. 4,684,300, Cl. 409-134.000.

Brecht, William B.; and Misra, Sudhan S., to C & D Power Systems, Inc. Post seal and method of manufacture for lead-acid batteries. 4,683,647, Cl. 29-623.200.

Bredenkamp, Gordon L., to Crucible, Societe Anonyme. Transistor base drive circuit. 4,684,879, Cl. 323-289.000.

Breitkreuz, Helmut; Clement, Albrecht; Mayer, Dieter; Ruppmann, Claus; Walz, Dieter; Wild, Ernst; and Zechnall, Martin, to Robert Bosch GmbH. Apparatus for venting a fuel tank. 4,683,861, Cl. 123-520.000.

Brender, David T.: *See—*
Kurtti, Gary R.; Ches, Gregory S.; Brender, David T.; and Senopole, John J., 4,684,077, Cl. 242-107.600.

Breuer, Kornelia; Gelderie, Udo; Holzer, Gerhard; and Raedisch, Helmer, to Saint-Gobain Vitrage. Transparent coating layer with self-repairng and fog-resistant properties which can be utilized on panes. 4,684,694, Cl. 524-730.000.

Brewer, Clarence T., to Solo Cup Company. Cup dispensing system. 4,684,036, Cl. 221-61.000.

Brewer, Daniel J. Eccentric float apparatus. 4,683,908, Cl. 137-426.000.

Brewer, Jimmy D.; Gunther, Albert W., Jr.; and Gunther, Albert W., Sr., to Pressure Services, Inc. Auxiliary workover rig. 4,684,306, Cl. 414-22.000.

Bridgestone Corporation: *See—*
Yahagi, Mitsuhisa, 4,683,928, Cl. 152-209.00R.

Briggs & Stratton Corporation: *See—*
Tharman, Paul A., 4,684,917, Cl. 340-59.000.

Briguet, Andre ; and Goldman, Maurice, to Commissariat a l'Energie Atomique. Process for the generation and processing of signals for obtaining by nuclear magnetic resonance a distortion-free image from a heterogeneous polarization field. 4,684,890, Cl. 324-309.000.

Brinegar, John R.; and Freeman, William R., to Howmet Turbine Components Corporation. Heat resistant alloys with low strategic alloy content. 4,684,505, Cl. 420-81.000.

Brinson, Edward P.: *See—*
Tomczak, Roman M.; Evans, Alfred J.; Chen, Grant K. R.; and Brinson, Edward P., 4,683,615, Cl. 17-1.00R.

Brisland, Michael J. Slide valve. 4,683,914, Cl. 137-625.480.

Brissot, Louis: *See—*
Berger, Jean-Luc; Brissot, Louis; and Cazaux, Yvon, 4,684,993, Cl. 358-213.310.

British Petroleum Company p.l.c.: *See—*
Hopper, Hans P., 4,684,291, Cl. 405-190.000.
McKechnie, Malcolm T.; and Thompson, David G., 4,684,457, Cl. 208-188.000.
Owen, Alan E.; Sarrabayrouse, Gerard; LeComber, Peter G.; and Spear, Walter E., 4,684,972, Cl. 357-59.000.

Brittain, Virgil R.: *See—*
Cybulsky, Michael; Piwonka, Thomas S.; and Brittain, Virgil R., 4,683,936, Cl. 164-122.100.

Brockway, Charles E.; and Saeli, John J., to Nalge Company. Electrically powered and heated endodontic syringe. 4,684,344, Cl. 433-81.000.

Brookes & Gatehouse Limited: *See—*
Gill, Michael J., 4,685,093, Cl. 367-89.000.

Brooks, Gary T., to Standard Oil Company (Indiana). Injection moldable polyamide-imide containing aromatic sulfone polymers. 4,684,674, Cl. 523-205.000.

Brooks, Janet L.: *See—*
Shaw, Herbert J.; Youngquist, Robert C.; and Brooks, Janet L., 4,684,215, Cl. 350-96.290.

Brooks, John C., to Edo Corporation/Fiber Science Division. Method fabricating a collapsible mandrel structure to be used in manufacturing reinforced hollow tanks. 4,684,423, Cl. 156-156.000.

Brookshire, Richard E.: *See—*
French, Daniel B.; Brookshire, Richard E.; and Schnelle, Joseph W., 4,685,067, Cl. 364-513.000.

Brother Kogyo Kabushiki Kaisha: *See—*
Miki, Yasuhiro, 4,684,269, Cl. 400-82.000.
Sakakibara, Kenji; Harano, Tetsuo; Bandai, Yasuhito; and Ohta, Eiichi, 4,684,999, Cl. 358-294.000.
Ueno, Hideo, 4,684,274, Cl. 400-320.000.

Brotz, Gregory R. Apparatus for bulk production of carbon fibers. 4,684,336, Cl. 425-8.000.

Broughman, John D., Jr.; Calvert, Barry G.; and Hill, Danny B., to Westvaco Corporation. Cannister seal integrity tester. 4,683,745, Cl. 73-49.200.

Brouha, Marcel: *See—*
De Wit, Hendrik J.; Brouha, Marcel; Enz, Ulrich E.; Jager, Kornelis; Van Der Borst, Albertus J. C.; and Turk, Gijsbertus W., 4,685,012, Cl. 360-125.000.

Brouwer, Geert; and Wadman, Sipke, to U.S. Philips Corporation. Spectrometer. 4,684,251, Cl. 356-315.000.

Brown, Arthur E. Reciprocating multicylinder vee machines with secondary counterbalancers. 4,683,849, Cl. 123-192.00B.

Brown, James W.; Chen, Tsang J.; and Schen, Michael A., to Eastman Kodak Company. Latex compositions comprising loadable polymeric particles. 4,684,608, Cl. 430-629.000.

Brown, Mark W.; and Dubke, Robert E., to International Business Machines Corporation. Displays having different resolutions for alphanumeric and graphics data. 4,684,936, Cl. 340-721.000.

Brown, Neil L., to Sundstrand Corporation. Power transmission disconnect device with an operational interlock. 4,684,000, Cl. 192-67.00R.

Brownawell, Darrell W.: *See—*
Bock, Jan; Brownawell, Darrell W.; Gutierrez, Antonio; Robbins, Max L.; Shaub, Harold; and Steyn, Peter L., 4,684,473, Cl. 252-49.800.

Brugnoli, Vincenzo, to Amici, Francesco. Valve for the interception and regulation of flow with a fixed tubular sealing element. 4,683,907, Cl. 137-414.000.

Brunswick Manufacturing Co., Inc.: *See—*
Hewson, Carl E., 4,683,890, Cl. 128-419.0PG.

Bryant, Lynn A.; Roberts, Durward T., Jr.; Beckman, Joseph A.; Tazewell, Joseph H.; and Cetnar, James F., to Firestone Tire & Rubber Company, The. Polymer transfer decals comprising saturated elastomers. 4,684,420, Cl. 156-116.000.

Bryant, Lynn A.: *See—*
Shurman, Louis W.; and Bryant, Lynn A., 4,684,431, Cl. 156-394.100.

Bryson, Michael A.: *See—*
Watson, Alan R.; and Bryson, Michael A., 4,685,137, Cl. 381-174.000.

Brzezinski, Denis R.: *See—*
Cummings, Ralph E.; and Brzezinski, Denis R., 4,683,678, Cl. 49-426.000.

BTA Boden-Technik AG: *See—*
Rollin, Carl; and Rufenacht, Hanspeter, 4,683,690, Cl. 52-126.200.

Bubendorff, Richard. Rolling shutter. 4,683,932, Cl. 160-133.000.

Bucci, George H., to Whitehead Engineered Products, Inc. Fuel routing systems for fuel-injected engines. 4,683,864, Cl. 123-575.000.

Buchanan, Robert L.; and Dull, Henry F., Jr. Novel rubber connectors and other rubber parts for use in human infusion sets and rubber. 4,684,672, Cl. 523-100.000.

Buchar, Wayne A.; and Russell, James P., to Xerox Corporation. Scan assembly moved between alternate positions to prevent platen overheating. 4,684,237, Cl. 355-8.000.

Buck, Erwin: *See—*
Murali, Jagannathan; and Buck, Erwin, 4,684,447, Cl. 204-38.500.

Buddenbaum, Harry C.; and Robison, Robert L., to Eli Lilly and Company. Pharmaceutical compositions for storage in plastic containers and process therefor. 4,684,643, Cl. 514-204.000.

Budinski, John A., to General Motors Corporation. Transmission ratio selector. 4,683,768, Cl. 74-411.500.

Buess, Gerd: *See—*
Hutterer, Frieder; Buess, Gerd; and Boebel, Manfred, 4,683,885, Cl. 128-334.00R.

Bugner, Douglas E.: *See—*
Bonser, Steven M.; Bugner, Douglas E.; and Demejo, Lawrence P., 4,684,596, Cl. 430-110.000.

Bunting, Larry T. Article heating cabinet. 4,684,787, Cl. 219-400.000.

Burandt, Corliss O., to Investment Rarities, Incorporated. Apparatus utilizing a plural-profiled cam unit for actuating the valve of an internal combustion engine. 4,683,848, Cl. 123-90.600.

Burchmore, William: *See*—
Drolet, Denis; Burchmore, William; and Drolet, Leo , 4,684,130, Cl. 273-67.00A.

Burger, Kalman: *See*—
Nagy, Geza T.; Szepesi, Gabor; Gazdag, Maria; Papp nee Sziklay, Zsofia; and Burger, Kalman, 4,684,638, Cl. 514-185.000.

Burgwin, Michael. Belt-mounted bow and arrow support device and method. 4,684,047, Cl. 224-253.000.

Burke, James E.: *See*—
Furbee, Avery D.; Pleil, Viktor W.; and Burke, James E., 4,685,118, Cl. 378-114.000.

Burke, Michael J.: *See*—
Diller, Calvin D.; and Burke, Michael J., 4,684,881, Cl. 323-354.000.

Burke, Timothy M.: *See*—
Smith, Paul F.; Schorman, Eric R.; and Burke, Timothy M., 4,684,941, Cl. 340-825.520.

Burlington Industries, Inc.: *See*—
McGee, James N., Jr., 4,684,569, Cl. 428-286.000.

Burnham, Marie E.: *See*—
Varker, Charles J.; Wilson, Syd R.; and Burnham, Marie E., 4,683,637, Cl. 437-63.000.

Burns, Barbara: *See*—
Shuman, Ralph J.; and Burns, Barbara, 4,684,685, Cl. 524-270.000.

Burns, Francis C.; and Carden, Gary R., to International Business Machines Corp. Method of simultaneously etching personality and select. 4,684,436, Cl. 156-643.000.

Burns, Robert V., to GTE Communication Systems Corporation. Subscriber line circuit having an improved loop current supply circuit. 4,685,130, Cl. 379-413.000.

Burnside, Orvin C.: *See*—
Solie, John B.; Wittmuss, Howard D.; and Burnside, Orvin C., 4,683,826, Cl. 111-7.000.

Burr Oak Tool & Gauge Co.: *See*—
Sbalchiero, Carlo; and Giorgio, Brazzale, 4,683,649, Cl. 29-726.000.

Burron Medical Inc.: *See*—
Raines, Kenneth C., 4,683,916, Cl. 137-854.000.

Burroughs Corporation: *See*—
Appelbaum, Matthew A.; Lehman, David B.; Nieglos, Donald J.; Nolte, Stanley C.; and Oehler, Michael P., 4,683,968, Cl. 380-4.000.

Burton, George; and Best, Desmond J., to Beecham Group. Antibacterial penicillins and cephalosporins. 4,684,639, Cl. 514-194.000.

Burton, Robert J.: *See*—
Bigham, C. Bruce; Burton, Robert J.; and McGregor, James E. A., 4,684,180, Cl. 439-29.000.

Busboom, Garry W., to Deutz-Allis Corporation. Dual rotating spreaders for harvester discharge. 4,684,068, Cl. 239-665.000.

Busetto, Carlo: *See*—
Greco, Alberto; Busetto, Carlo; Cassar, Luigi; and Neri, Carlo, 4,684,726, Cl. 544-69.000.

Bussiere, Laurent L. Agricultural implement including a central section and two wing sections. 4,683,957, Cl. 172-311.000.

Butler, David L., to Oberg Enterprises, Inc. Tilting hoist tackle. 4,684,162, Cl. 294-82.120.

Butler Manufacturing Company: *See*—
Churchman, James E., 4,683,698, Cl. 52-655.000.

Butler, Ronald G.; Lehman, John R.; Gray, Douglas S.; and Houck, Wayne R., to ITT Corporation. Trunnion type ball valve. 4,683,906, Cl. 137-375.000.

Butts, Gene A.; Garsee, Henry A.; Kelley, Charles D.; Petty, Bruce R.; and Pauley, James L., to Helena Laboratories Corporation. Method of scanning optical density patterns. 4,684,244, Cl. 356-39.000.

C.C.L. South Africa (Proprietary) Limited: *See*—
Lamont, Patrick A., 4,683,784, Cl. 81-22.000.

C & D Power Systems, Inc.: *See*—
Brecht, William B.; and Misra, Sudhan S., 4,683,647, Cl. 29-623.200.

C. F. Braun & Co.: *See*—
Lam, Wilfred K., 4,684,759, Cl. 585-652.000.

Cable, Neil, to Agence Spatiale Europeenne. Releasable connector apparatus. 4,684,285, Cl. 403-331.000.

Cabot Corporation: *See*—
Bergman, Roger M.; and Mosheim, Charles E., 4,684,399, Cl. 75-0.5BB.

Cacaofabriek de Zaan B.V.: *See*—
Terpstra, Paulus N., 4,684,466, Cl. 210-227.000.

Cadossi, Ruggero; and Marazzi, Donata. Method and device for treating living tissues and/or cells by means of pulsating electromagnetic fields. 4,683,873, Cl. 128-1.500.

Calcavecchio, Peter: *See*—
Eustace, Daniel J.; Siano, Donald B.; Drake, Evelyn N.; and Calcavecchio, Peter, 4,683,953, Cl. 166-294.000.

Caldara, Steve: *See*—
Lemone, Lou; Faletra, Salvatore; McDaniel, John R.; and Caldara, Steve, 4,685,057, Cl. 364-200.000.

Calder, Iain D.: *See*—
Naguib, Hussein M.; Calder, Iain D.; Ho, Vu Q.; and Naem, Abdalla A., 4,683,645, Cl. 437-41.000.

Callahan, James F.; Huffman, William F.; Moore, Michael L.; and Yim, Nelson C., to SmithKline Beckman Corporation. Methods of producing vasodilation or antioxytocic activity. 4,684,621, Cl. 514-11.000.

Calspan Corporation: *See*—
Hammill, Harry B., III, 4,684,247, Cl. 356-152.000.

Calvert, Barry G.: *See*—
Broughman, John D., Jr.; Calvert, Barry G.; and Hill, Danny B., 4,683,745, Cl. 73-49.200.

Calviello, Joseph A., to Eaton Corporation. Method for fabricating MOMS semiconductor device. 4,683,642, Cl. 437-40.000.

Camarda, Renato M.: *See*—
Ackerman, David A.; Camarda, Renato M.; Hartman, Robert L.; and Spector, Magaly, 4,684,883, Cl. 324-71.500.

Canada, Atomic Energy of, Limited: *See*—
Bigham, C. Bruce; Burton, Robert J.; and McGregor, James E. A., 4,684,180, Cl. 439-29.000.

Canepa, George R., to Intel Corporation. Apparatus for selecting alternate addressing mode and read-only memory. 4,685,084, Cl. 365-189.000.

Cannata, Joseph M. Positive interconnect system. 4,683,623, Cl. 126-123.000.

Cannon, Thomas C., Jr.: *See*—
Anderson, Jerry M.; Cannon, Thomas C., Jr.; Darden, Bruce V.; and Smith, Donald T., 4,684,195, Cl. 439-404.000.

Cannondale Corporation: *See*—
Patterson, Thomas C., 4,684,281, Cl. 403-197.000.

Canon Kabushiki Kaisha: *See*—
Hirosawa, Toshiaki; Akiyama, Yoshie; Ebisawa, Isao; Hattori, Yoshifumi; and Abe, Tsutomu, 4,684,962, Cl. 346-140.00R.
Ikemori, Keiji; and Kato, Masatake, 4,684,223, Cl. 350-427.000.
Kodaira, Takanori; Namai, Akihiro; and Egawa, Akira, 4,684,233, Cl. 354-400.000.
Takayanagi, Yoshiaki; Ishida, Masato; and Miura, Makoto, 4,684,239, Cl. 355-14.00R.
Tanioka, Hiroshi; and Ueda, Noriyoshi, 4,684,998, Cl. 358-293.000.

Cantello, Maichi; and Manino, Pier Giuseppe, to R T M Istituto per le Ricerche di Tecnologia Meccanica e per l'Automazione. Laser beam focusing head. 4,684,780, Cl. 219-121.0LQ.

Capek, George, to Weinschel Engineering. Load-bearing detent mechanism. 4,684,905, Cl. 333-81.00R.

Capetronic (BSR) Ltd.: *See*—
Ma, John; and Weiss, Steven, 4,684,858, Cl. 318-317.000.

Capewell Components Company Limited Partnership: *See*—
Maziarz, John D., 4,684,083, Cl. 244-151.00A.

Capp, Randolph E., to AMP Incorporated. Press fit cable termination for printed circuit boards. 4,684,200, Cl. 439-387.000.

Caprio, Joseph R.: *See*—
Smith, Philip L.; and Caprio, Joseph R., 4,684,196, Cl. 439-411.000.

Capriotti, Bruce W.: *See*—
Worns, John R.; Chase, James W.; and Capriotti, Bruce W., 4,684,600, Cl. 430-271.000.

Caracini, Pietro; and Cucinotta, Luigi, to Automotive Products plc. Friction clutch driven plate. 4,684,006, Cl. 192-106.200.

Carden, Gary R.: *See*—
Burns, Francis C.; and Carden, Gary R., 4,684,436, Cl. 156-643.000.

Cardiovascular Systems, Inc.: *See*—
Feldman, Louis W.; and Yawn, David H., 4,684,361, Cl. 494-41.000.

Cari-All Inc.: *See*—
Trubiano, Antoine, 4,683,609, Cl. 16-114.00R.

Carl, Alfred: *See*—
Lattion, Andre ; Carl, Alfred; and Oehler, Reinhard, 4,684,307, Cl. 414-31.000.

Carlini, Filippo M.: *See*—
Marraccini, Antonio; Carlini, Filippo M.; Pasquale, Antonio; and Pontevivo, Michele, 4,684,408, Cl. 106-300.000.

Carlomagno, William D., to Raychem Corporation. Conductive polymer circuit protection devices having improved electrodes. 4,685,025, Cl. 361-106.000.

Carlson, Erland F. Clutching apparatus and method of clutching. 4,684,001, Cl. 192-70.000.

Carlson, Lee R.; Hegedus, Denes A.; Jarrett, Steven M.; Miller, Michael F.; Riley, Martin E.; and Wright, David L., to Spectra-Physics, Inc. Gas laser construction. 4,685,109, Cl. 372-61.000.

Carlson, Lee R.: *See*—
DeBell, Gary W.; Wright, David L.; Ruddock, Kenneth A.; Petersen, Alan B.; Carlson, Lee R.; and von Gunten, Marc K., 4,685,110, Cl. 372-103.000.

Carlson, Richard A., to General Motors Corporation. Motor vehicle electrical system providing multiple DC voltages. 4,684,818, Cl. 307-10.00R.

Carlsson, Staffan: *See*—
Andersson, Susanne; Gustafsson, Jan-Erik; Herngren, Torbjorn; and Carlsson, Staffan, 4,683,841, Cl. 122-22.000.

Carmichael, Bruce. Boat canopy. 4,683,900, Cl. 135-88.000.

Carpentier, Claude. Audio amplifier for a motor vehicle. 4,684,899, Cl. 330-149.000.

Carroll, Arthur B.; Hough, Stewart E.; Hunter, Paul R.; Carstedt, John K.; Shaw, Sam R.; and Garrett, James E., to Carroll Touch Inc. Signal preconditioning for touch entry device. 4,684,801, Cl. 250-221.000.

Carroll Touch Inc.: *See*—
Carroll, Arthur B.; Hough, Stewart E.; Hunter, Paul R.; Carstedt, John K.; Shaw, Sam R.; and Garrett, James E., 4,684,801, Cl. 250-221.000.

Carstedt, John K.: *See*—
Carroll, Arthur B.; Hough, Stewart E.; Hunter, Paul R.; Carstedt, John K.; Shaw, Sam R.; and Garrett, James E., 4,684,801, Cl. 250-221.000.

Carter, Dennis R., to Kirschner Medical Corporation. Osteosynthetic fixation plate. 4,683,878, Cl. 128-92.0YP.

Carter, Garry L., to Medical Engineering Corp. Method and apparatus for measuring dynamic fluid flow rate. 4,683,748, Cl. 73-226.000.

Caruso, Michele: *See—*
Bargiotti, Alberto; Caruso, Michele; Suarato, Antonino; Penco, Sergio; and Giuliani, Fernando, 4,684,629, Cl. 514-34.000.

Cary, Paul: *See—*
Rudy, Michael; Cary, Paul; Anderson, Gary S.; and Roth, Arthur A., 4,685,095, Cl. 369-36.000.

Casanova, Damien, to Mavilor Systemes S.A. Electric motor with deformable disk brake. 4,684,838, Cl. 310-93.000.

Cash, Damon L. Convertible maternity non-maternity apparel. 4,683,595, Cl. 2-105.000.

Casio Computer Co., Ltd.: *See—*
Bito, Hiroyasu, 4,684,791, Cl. 235-380.000.
Honjo, Yoshiaki; and Shioya, Masaharu, 4,683,973, Cl. 180-252.000.
Honjo, Yoshiaki, 4,685,147, Cl. 382-66.000.
Sakashita, Shigeo, 4,683,794, Cl. 84-1.030.

Caspers, John: *See—*
Van Driesen, Roger P.; Adams, William R.; Caspers, John; Baldasarri, Mario; and Trimble, Harold, 4,684,456, Cl. 208-143.000.

Cassar, Luigi: *See—*
Greco, Alberto; Busetto, Carlo; Cassar, Luigi; and Neri, Carlo, 4,684,726, Cl. 544-69.000.

Castronuovo, Lucia: *See—*
Marotta, Enrico; and Castronuovo, Lucia, 4,684,649, Cl. 514-249.000.

Caterpillar Inc.: *See—*
Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., 4,684,321, Cl. 415-202.000.
Hafele, Joseph C.; and Crayton, John W., 4,685,066, Cl. 364-509.000.
Kalman, Peter, 4,683,632, Cl. 29-281.100.

Cattani, Augusto, to Officine Augusto Cattani & C.S.p.A. Spittle separation and disposal device incorporating a drainage pump, in particular for suction equipment used in dentistry. 4,684,345, Cl. 433-92.000.

Cavalleri, Bruno: *See—*
Malabarba, Adriano; and Cavalleri, Bruno, 4,684,644, Cl. 514-210.000.

Cavender, Ralston R., Jr.; Connolly, Elizabeth S.; Powers, Dale R.; and Ritter, John E., to Corning Glass Works. Methods for reducing the water content of optical waveguide fibers. 4,684,383, Cl. 65-3.120.

Cazaux, Yvon: *See—*
Berger, Jean-Luc; Brissot, Louis; and Cazaux, Yvon, 4,684,993, Cl. 358-213.310.

Cecil, Dimitrios G. Resistance spot welding gun and transformer assembly. 4,684,778, Cl. 219-89.000.

Cemenska, Richard A.: *See—*
Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., 4,684,321, Cl. 415-202.000.

Cencorp: *See—*
Lopez, Gilbert T., 4,683,789, Cl. 83-35.000.

Central Plastics Company: *See—*
Eggleston, Dean E., 4,684,789, Cl. 219-497.000.

Centre Technique des Industries Mecaniques: *See—*
Auger, Marc, 4,684,865, Cl. 318-696.000.

Cerez, Pierre: *See—*
Avila, Gerardo; and Cerez, Pierre, 4,684,900, Cl. 331-3.000.

Cerline Ceramic Corporation: *See—*
Davis, Thomas E., 4,684,155, Cl. 285-16.000.

Cerni, Samuel: *See—*
Wilson, John F.; Gjertsen, Robert K.; and Cerni, Samuel, 4,684,495, Cl. 376-352.000.

Ceskoslovenska akademie ved: *See—*
Krovak, Premysl; and Salvet, Miroslav, 4,684,614, Cl. 435-316.000.

Cetnar, James F.: *See—*
Bryant, Lynn A.; Roberts, Durward T., Jr.; Beckman, Joseph A.; Tazewell, Joseph H.; and Cetnar, James F., 4,684,420, Cl. 156-116.000.

Cetus Corporation, The Board of Trustees of the: *See—*
Larrick, James W.; Ringold, Gordon M.; Mark, David F.; Lin, Leo S.; and Torti, Frank M., 4,684,623, Cl. 514-12.000.

Champion Spark Plug Company: *See—*
Clark, Ronnie W.; and Ameling, Dale P., 4,684,352, Cl. 445-7.000.

Chan, Albert: *See—*
Tsui, Cyrus; Chan, Andrew K. L.; Chan, Albert; Fitzpatrick, Mark E.; and Ansari, Zahid, 4,684,830, Cl. 307-465.000.

Chan, Andrew K. L.: *See—*
Tsui, Cyrus; Chan, Andrew K. L.; Chan, Albert; Fitzpatrick, Mark E.; and Ansari, Zahid, 4,684,830, Cl. 307-465.000.

Chan, Daniel F., to TRW Inc. Reference current generator circuit. 4,684,880, Cl. 323-316.000.

Chan, Steve Y.: *See—*
France, Michael G.; Geannopoulos, George L.; Bosnyak, Robert J.; and Chan, Steve Y., 4,684,826, Cl. 307-272.00A.

Chan, Sun-Shiu D.: *See—*
Little, Thomas N.; Longo, Lorenzo L.; and Chan, Sun-Shiu D., 4,684,832, Cl. 307-520.000.

Chang, Jaw-Kang: *See—*
Hosobuchi, Yoshio; Lee, Nancy M.; Loh, Horace H.; and Chang, Jaw-Kang, 4,684,624, Cl. 514-15.000.

Chang, Raymond S. L.; and Parsons, William H., to Merck & Co., Inc. Benzofused lactams as cholecystokinin antagonists. 4,684,645, Cl. 514-213.000.

Chang, Raymond S. L.; and Evans, Ben E., to Merck & Co., Inc. 2-acylaminomethyl-1,4-benzodiazepine derivatives as CCK-antagonists. 4,684,646, Cl. 514-221.000.

Chang, Wen-Hsuan; Blackburn, William P.; Prucnal, Paul J.; and Dufford, Edward L., to PPG Industries, Inc. Compositions based on silane hydrolyzates and vinyl polymers containing hydrolyzable silyl groups. 4,684,697, Cl. 525-100.000.

Changras, Valley. Orthopedic guide. 4,683,876, Cl. 128-80.00R.

Chapa, Xavier. Asphaltic pavement tiles. 4,684,288, Cl. 404-35.000.

Chapman, Harry A.; and Lauson, David J., to GET Communication Systems Corporation. Arrangement for on-line diagnostic testing of an off-line standby processor in a duplicated processor configuration. 4,684,885, Cl. 324-73.00R.

Chapman, Hugh N.: *See—*
Taylor, David L., Sr.; and Chapman, Hugh N., 4,684,967, Cl. 357-23.110.

Charles, Richard J.; Mitoff, Stephan P.; and Pasco, Wayne D., to General Electric Company. Secondary metallization by glass displacement in ceramic substrate. 4,684,446, Cl. 204-15.000.

Charles Stark Draper Laboratory, Inc., The: *See—*
Johnson, William M., 4,684,796, Cl. 250-201.000.
Welling, Peter A., 4,685,114, Cl. 375-22.000.

Charmeux, Gilbert, to Societe d'Etudes Techniques et d'Entreprises Generales. Fastening device of electroluminescent diodes on a sealed display table. 4,684,940, Cl. 340-815.200.

Charters, Ian J.: *See—*
Clifford, Rodney J.; and Charters, Ian J., 4,684,322, Cl. 416-95.000.

Chase, James W.: *See—*
Worns, John R.; Chase, James W.; and Capriotti, Bruce W., 4,684,600, Cl. 430-271.000.

Chauvel, Gerard, to Texas Instruments Incorporated. System for displaying data on a video screen in graphical mode. 4,684,938, Cl. 340-747.000.

Chen, Grant K. R.: *See—*
Tomczak, Roman M.; Evans, Alfred J.; Chen, Grant K. R.; and Brinson, Edward P., 4,683,615, Cl. 17-1.00R.

Chen, Michael S., to Air Products and Chemicals, Inc. High pressure process for sulfur recovery from a hydrogen sulfide containing gas stream. 4,684,514, Cl. 423-574.00R.

Chen, Sen-Tsuen: *See—*
Chung, Jing-Yau; Chen, Sen-Tsuen; Wainerdi, James C.; and Miller, Mark A., 4,685,091, Cl. 367-31.000.

Chen, Tsang J.: *See—*
Brown, James W.; Chen, Tsang J.; and Schen, Michael A., 4,684,608, Cl. 430-629.000.

Chen, Wuu N.: *See—*
Wang, Chun S.; Chen, Wuu N.; Bowden, Robert L.; and Berman, Jody R., 4,684,700, Cl. 525-481.000.
Wang, Chun S.; Bowden, Robert L.; and Chen, Wuu N., 4,684,701, Cl. 525-507.000.

Chen, Ying C.: *See—*
Seymour, Robert J.; Liu, Jia-ming; and Chen, Ying C., 4,685,108, Cl. 372-19.000.

Chenot, Charles F.; Gray, Leslie F.; and Krebs, Michael A., to GTE Products Corporation. Process for producing coated europium activated strontium borate phosphors. 4,684,539, Cl. 427-64.000.

Chernikov, Jury L.; Patykivsky, Bodgan I.; and Chernovol, Vladimir A. Device for magnetic holding of workpieces. 4,684,112, Cl. 269-8.000.

Chernovol, Vladimir A.: *See—*
Chernikov, Jury L.; Patykivsky, Bodgan I.; and Chernovol, Vladimir A., 4,684,112, Cl. 269-8.000.

Ches, Gregory S.: *See—*
Kurtti, Gary R.; Ches, Gregory S.; Brender, David T.; and Senopole, John J., 4,684,077, Cl. 242-107.600.

Cheung, Kin L.; and Einarson, Jeffrey W., to Wang Laboratories, Inc. Simplified cache with automatic update. 4,685,082, Cl. 365-49.000.

Chicopee: *See—*
Malaney, Frank E., 4,684,570, Cl. 428-296.000.

Chiron-Werke GmbH: *See—*
Winkler, Hans-Henning; and Rutschle, Eugen, 4,683,638, Cl. 29-568.000.

Chisso Corporation: *See—*
Kitano, Kisei; Ogawa, Tetsuya; Furukawa, Yoshito; Yoshida, Naoyuki; Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; and Nigorikawa, Kazunori, 4,684,476, Cl. 252-299.610.
Sugimori, Shigeru; Nigorikawa, Kazunori; and Ogawa, Tetsuya, 4,684,477, Cl. 252-299.610.
Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Ogawa, Tetsuya; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,684,478, Cl. 252-299.630.

Choate, William C., to Texas Instruments Incorporated. Method and apparatus for detecting edge spectral features. 4,685,143, Cl. 382-25.000.

Chretien, Jean-Basile, to AG-JBC (Sarl). Method for modifying the surface state of materials. 4,684,548, Cl. 427-197.000.

Christenson, Ronald E., to McNeilus Truck and Manufacturing, Inc. Steerable auxiliary axle. 4,684,142, Cl. 280-81.00R.

Christiansen, Robert G.; Bell, Malcolm R.; Herrmann, John L., Jr.; and Opalka, Chester J., Jr., to Sterling Drug Inc. Antiandrogenic sulfonylsteroidopyrazoles and processes for preparation method of use and compositions thereof. 4,684,636, Cl. 514-176.000.

Chubb, Walston, to Westinghouse Electric Corp. Cadmium oxide glazed nuclear fuel pellet and glazing composition. 4,684,497, Cl. 376-419.000.

Chun, Chul G.: *See—*
Min, Seong K.; Kim, Yong J.; Lee, Hee W.; and Chun, Chul G., 4,685,009, Cl. 360-95.000.

Chung, Jing-Yau; Chen, Sen-Tsuen; Wainerdi, James C.; and Miller, Mark A., to Exxon Production Research Co. Method and apparatus for acoustic well logging. 4,685,091, Cl. 367-31.000.

Chung, Young Hoon: *See—*
Shin, Myung Chul; Kim, Chil Sung; Chung, Young Hoon; and Jee, Kwang Koo, 4,683,721, Cl. 60-527.000.

Churchman, James E., to Butler Manufacturing Company. Load transfer clip for roof panel support trusses. 4,683,698, Cl. 52-655.000.

Ciba Corning Diagnostics Corp.: *See—*
Hoskins, Michael K., 4,684,615, Cl. 436-16.000.

Ciba-Geigy Corporation: *See—*
Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, 4,684,730, Cl. 544-408.000.
Topfl, Rosemarie, 4,684,736, Cl. 548-309.000.

Ciga-Geiby Corporation: *See—*
Artz, Klaus; Meyer, Hans R.; Reinehr, Dieter; and Weber, Kurt, 4,684,744, Cl. 558-388.000.

Cigdem, Saffet; Lichnofsky, Rudiger; and Martin, Harry, to Bayerische Motoren Werke AG. Fluid friction clutch, utilizing fluid shear force between clutch plates and camming of plates together to increase fluid shears forces, especially for differential gears of motor vehicles. 4,683,998, Cl. 192-58.00C.

Ciminelli, Michael A.: *See—*
Derleth, James L.; and Ciminelli, Michael A., 4,683,756, Cl. 73-747.000.

Cincinnati Milacron Inc.: *See—*
French, Daniel B.; Brookshire, Richard E.; and Schnelle, Joseph W., 4,685,067, Cl. 364-513.000.

Cinzori, Robert J., to Hughes Aircraft Company. Apparatus and method for nighttime and low visibility alignment of communicators. 4,684,248, Cl. 356-152.000.

Citizen Watch Co., Ltd.: *See—*
Morimoto, Atsutaka, 4,684,864, Cl. 318-696.000.

Citron, Howard M.: *See—*
Becraft, Arthur D.; Citron, Howard M.; and Tatarski, Joseph E., 4,684,198, Cl. 439-571.000.

Clancey, Stephen M.: *See—*
Light, Gerard M.; Rocco, LeRoy E.; and Clancey, Stephen M., 4,683,999, Cl. 192-58.00B.

Clarion Co., Ltd.: *See—*
Tazaki, Satoru, 4,685,048, Cl. 363-127.000.

Clark, James A.; and Dobner, Michael H., to Bausch & Lomb Incorporated. Cable drive focusing mechanism for optical instruments. 4,684,225, Cl. 350-518.000.

Clark, Roger A.; Doherty, Paul D.; and Tolnar, Emil J., Jr., to General Motors Corporation. Sealed electrical connector with shroud. 4,684,190, Cl. 439-587.000.

Clark, Ronnie W.; and Ameling, Dale P., to Champion Spark Plug Company. Method for producing a composite spark plug center electrode. 4,684,352, Cl. 445-7.000.

Clark, Teddy R.: *See—*
Stewart, John M.; Clark, Teddy R.; and Edging, Thomas E., 4,684,512, Cl. 423-321.00R.

Clasen, Rolf, to U.S. Philips Corporation. Method for the manufacture of glass bodies. 4,684,385, Cl. 65-17.000.

Clasen, Rolf, to U.S. Phi'ips Corporation. Method for the manufacture of glass bodies. 4,684,386, Cl. 65-18.100.

Clasen, Rolf; and Hermann, Wilhelm G., to U.S. Philips Corporation. Method for manufacturing glass bodies. 4,684,387, Cl. 65-18.400.

Clecim: *See—*
Damiron, Pierre M.; and Legoupil, Jean-Luc, 4,684,451, Cl. 204-141.500.

Clemens, Karl-Heinz, to O&K Orenstein & Koppel Aktiengesellschaft. Blade guide system for grading vehicle with displaceable grading blade. 4,683,959, Cl. 172-795.000.

Clement, Albrecht: *See—*
Breitkreuz, Helmut; Clement, Albrecht; Mayer, Dieter; Ruppmann, Claus; Walz, Dieter; Wild, Ernst; and Zechnall, Martin, 4,683,861, Cl. 123-520.000.

Clifford, Rodney J.; and Charters, Ian J., to Rolls-Royce plc. Cooled turbine blade. 4,684,322, Cl. 416-95.000.

Clipper, Donald; and Norfleet, James, to Colgate-Palmolive Company. Mouthrinse composition containing hydrogen peroxide and fluoride. 4,684,517, Cl. 424-52.000.

Cloud, John A., to Energy Machinery. Oil separator. 4,684,467, Cl. 210-519.000.

Clough, John M.; and Griffin, David A., to Imperial Chemical Industries Plc. Triazole and imidazole compounds useful as plant growth regulators and fungicides. 4,684,396, Cl. 07-92.000.

Coash, Ronald J., to Emhart Industries, Inc. Garage door opener using transmitter with SAW oscillator modulator. 4,684,853, Cl. 318-16.000.

Cobe Laboratories, Inc.: *See—*
Dykstra, Raymond C., 4,684,102, Cl. 251-7.000.

Coca-Cola Company, The: *See—*
Wasserstrom, Henry; and Kennedy, Richard T., 4,684,039, Cl. 222-129.100.

Codenotti, Giovanni. Apparatus for drying metal turnings or scrap. 4,683,664, Cl. 34-35.000.

Cofpa: *See—*
Dufour, Marcel, 4,683,624, Cl. 28-141.000.

Cohen, Mordehy; Bettenga, James L.; and Tjenstrom, Brian, to Sundstrand Corporation. Scavenge oil system. 4,683,984, Cl. 184-6.200.

Colby, Donald B., to Lee L. Woodard, Inc. Foldable chaise lounge. 4,684,170, Cl. 297-19.000.

Cole, Graham M., to Dreamland Electrical Appliances PLC. Electric blankets. 4,684,785, Cl. 219-212.000.

Cole, Jack M.: *See—*
Abbe, Bruce W.; and Cole, Jack M., 4,684,472, Cl. 210-720.000.

Cole, Richard D. Method of making an insulated window space assembly. 4,683,634, Cl. 29-412.000.

Cole, Sheila N. Curl keeping hair cap. 4,683,596, Cl. 2-174.000.

Coleman, Hollis: *See—*
Miller, Arthur O.; Coleman, Hollis; Atkinson, Roger; and Dorsey, Boyd, 4,685,127, Cl. 379-221.000.

Colgate; Gilbert, Jr., to United States Banknote Company L.P. Security tape with integrated hologram and magnetic strip. 4,684,795, Cl. 235-457.000.

Colgate-Palmolive Company: *See—*
Clipper, Donald; and Norfleet, James, 4,684,517, Cl. 424-52.000.

Colimitra, Thomas A., to Westinghouse Electric Corp. Hand gear train with three degrees of freedom. 4,683,772, Cl. 74-479.000.

Collier, Charles P. Matting lacquer, paint and light-transmitting matte film. 4,684,675, Cl. 523-220.000.

Collins, Daniel R.: *See—*
Egner, Walter A.; and Collins, Daniel R., 4,684,161, Cl. 294-1.100.

Collins, Robert J.: *See—*
Smitt, Eric L.; and Collins, Robert J., 4,685,124, Cl. 379-95.000.

Collins, Wayne, to Pillar Technologies, Inc. Electrode segments for corona discharge devices. 4,684,803, Cl. 250-324.000.

Columbus McKinnon Corporation: *See—*
Dicky, John, 4,684,070, Cl. 241-79.300.
Dicky, John, 4,684,071, Cl. 241-80.000.

Combustion Engineering, Inc.: *See—*
Leaseburge, Emory J.; and Thomas, Thomas J., 4,684,465, Cl. 210-198.200.

Comez S.p.A.: *See—*
Omodeo Zorini, Luigi, 4,683,727, Cl. 66-207.000.

Commissariat a l'Energie Atomique: *See—*
Bourrelly, Paul; Patin, Henri; Schoepp, Robert; and Sanson, Charles, 4,684,265, Cl. 374-43.000.
Briguet, Andre ; and Goldman, Maurice, 4,684,890, Cl. 324-309.000.
Lazzari, Jean-Pierre, 4,684,438, Cl. 156-649.000.
Massit, Claude; Nicolas, Gerard; and Turc, Gerard, 4,684,181, Cl. 439-59.000.

Compagnie d'Electronique et de Piezo - Electricite C.E.P.E.: *See—*
Avila, Gerardo; and Cerez, Pierre, 4,684,900, Cl. 331-3.000.

Compagnie Europeenne de Composants Electroniques LCC: *See—*
Mouries, Gerard, 4,685,027, Cl. 361-308.000.

Compagnie Industrielle de Mecanismes en abrege C. I. M.: *See—*
Periou, Pierre, 4,683,995, Cl. 192-8.00C.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Coppens, Christian; Perron, Gilbert; and Pouillard, Jean, 4,685,100, Cl. 370-58.000.

Computer Basic Technology Association: *See—*
Hanazono, Masanobu; Hara, Shinichi; Akiyama, Hirosi; Hayashi, Masaaki; Saitoo, Harunobu; and Kurisu, Takumi, 4,685,014, Cl. 360-126.000.

Computer Memories, Incorporated: *See—*
Nazarian, Ara W.; and Stupeck, Donald G., 4,685,007, Cl. 360-78.000.

ComSonics, Inc.: *See—*
Braun, Warren L.; and Curt, Walter M., 4,685,065, Cl. 364-485.000.

Conductive Container, Inc.: *See—*
Ohlbach, Ralph C., 4,684,020, Cl. 206-328.000.

Connolly, Elizabeth S.: *See—*
Cavender, Ralston R., Jr.; Connolly, Elizabeth S.; Powers, Dale R.; and Ritter, John E., 4,684,383, Cl. 65-3.120.

Conoco Inc.: *See—*
Murali, Jagannathan; and Buck, Erwin, 4,684,447, Cl. 204-38.500.

Contraves AG: *See—*
Frei, Urs; Richter, Harald; and Stait, Donald, 4,684,276, Cl. 400-630.000.
Heller, Rudolf, 4,684,088, Cl. 248-123.100.

Cooke, Michael D.; and Ross, Barry C., to Hoechst Aktiengesellschaft. Antibacterial penem derivatives. 4,684,640, Cl. 514-195.000.

Cooper Industries, Inc.: *See—*
Akiyama, Steven R.; Zaker, Ronald C.; and Shoup, Curtis C., 4,685,037, Cl. 362-276.000.

Copal Company Limited: *See—*
Takanori, Kohno, 4,684,234, Cl. 354-421.000.

Copland, Donald S.; Halstead, Larry D.; and O'Brien, Lawrence E., to Procter & Gamble Company, The. Shaped thermoformed flexible film container for granular products and method and apparatus for making the same. 4,684,025, Cl. 206-484.000.

Coppens, Christian; Perron, Gilbert; and Pouillard, Jean, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Digital trunk adapter terminal unit. 4,685,100, Cl. 370-58.000.

Coq, Jean L., to Du Pont de Nemours, E. I., and Company. Non-stick silicone blend coating. 4,684,577, Cl. 428-447.000.

Cordis Corporation: *See—*
Pohndorf, Peter J., 4,683,895, Cl. 128-784.000.

Corlett, Ewan C. B., to Hydroconic Limited. Ship's steering systems. 4,683,830, Cl. 114-163.000.

Cornelius, Billie G. Tree and brush cutting and chipping apparatus. 4,683,924, Cl. 144-3.00D.

Cornellier, Vincent; and Ziegler, Thomas K. Biomonitoring stress management method and device. 4,683,891, Cl. 128-630.000.

Cornils, Boy: *See—*
Kessen, Gunther; Cornils, Boy; Gick, Wilhelm; Wiebus, Ernst; Hibbel, Joseph; Bach, Hanswilhelm; and Zgorzelski, Wolfgang, 4,684,750, Cl. 568-883.000.
Corning Glass Works: *See—*
Berkey, George E., 4,684,384, Cl. 65-3.120.
Borrelli, Nicholas F.; and Morse, David L., 4,684,222, Cl. 350-420.000.
Cavender, Ralston R., Jr.; Connolly, Elizabeth S.; Powers, Dale R.; and Ritter, John E., 4,684,383, Cl. 65-3.120.
Cortese, Richard: *See—*
Eckenhoff, James B.; Cortese, Richard; and Landrau, Felix A., 4,684,524, Cl. 424-469.000.
Cortopassi, Jeffery J., to Taco Bell. Content-identifying carton structure. 4,684,023, Cl. 206-459.000.
Costruzioni Italiane Serrature Affini C.I.S.A. S.p.A.: *See—*
Errani, Deo, 4,683,740, Cl. 70-419.000.
Cotter, David H.; Teerman, Richard F.; and Timmer, Robert C., to General Motors Corporation. Two-stage, hydraulic-assisted fuel injection nozzle. 4,684,067, Cl. 239-533.300.
Cox, Allen R.; Lowe, Anthony C.; and Wood, John C., to International Business Machines Corporation. Display cell with self-sealing, collapsing plug. 4,684,219, Cl. 350-343.000.
Cox, Roger W. Mobile home stanchions. 4,684,097, Cl. 248-354.300.
Craig, Clark E., to LLC Corporation. Locking system. 4,684,178, Cl. 312-221.000.
Craig, Daniel H., to Hercules Incorporated. Hydrophobically modified hydroxyethyl cellulose in aqueous polymerization dispersions. 4,684,704, Cl. 526-200.000.
Cramer, Scott L. Electric storage battery assembly. 4,684,580, Cl. 429-9.000.
Crayton, John W.: *See—*
Hafele, Joseph C.; and Crayton, John W., 4,685,066, Cl. 364-509.000.
Creel, Kirby B. Voltage regulating device using transistor means for voltage clipping and having load current compensation. 4,684,876, Cl. 323-268.000.
Crider, Brian D. View expansion enclosure with venting means. 4,683,687, Cl. 52-72.000.
Cronauer, Edward A.: *See—*
Picone, John D.; and Cronauer, Edward A., 4,684,821, Cl. 307-106.000.
Cronin, Michael J., to Lockheed Corporation. Multifunction power system for an aircraft. 4,684,081, Cl. 244-58.000.
Cross, Joseph B.: *See—*
Jones, Ronald D.; and Cross, Joseph B., 4,684,041, Cl. 222-161.000.
Crouzet: *See—*
Pitrat, Alain; and Truchet, Bernard, 4,684,770, Cl. 200-67.00R.
Crucible, Societe Anonyme: *See—*
Bredenkamp, Gordon L., 4,684,879, Cl. 323-289.000.
Cucinotta, Luigi: *See—*
Caracini, Pietro; and Cucinotta, Luigi, 4,684,006, Cl. 192-106.200.
Cullingford, Christopher V.; Forrester, John S.; and Smith, Gerald B., to Lucas Electrical Electronics and Systems Limited. Torque monitoring. 4,683,746, Cl. 73-118.100.
Cuming, Phyllis A.: *See—*
Wellman, Russel E.; and Cuming, Phyllis A., 4,684,271, Cl. 400-241.100.
Cummings, Ralph E.; and Brzezinski, Denis R., to Railcar Specialties, Inc. Adjustable railway boxcar door. 4,683,678, Cl. 49-426.000.
Curlett, Harry B., to Innotech Energy Corporation. Drill pipes and casings utilizing multi-conduit tubulars. 4,683,944, Cl. 166-65.100.
Curt, Walter M.: *See—*
Braun, Warren L.; and Curt, Walter M., 4,685,065, Cl. 364-485.000.
Cybulsky, Michael; Piwonka, Thomas S.; and Brittain, Virgil R., to TRW Inc. Controlled solidification, method of distributing strengthening additives and maintaining a constant melt level. 4,683,936, Cl. 164-122.100.
Dadpey, Habib; and Shero, David J., to Westinghouse Electric Corp. Induction motor control apparatus and method for restart when rotating in shutdown. 4,684,868, Cl. 318-802.000.
Dagard, Philippe, to Framatome & Cie. Ultrafiltration device in a pressurized water nuclear reactor. 4,684,494, Cl. 376-313.000.
Daikin Kogyo Co., Ltd.: *See—*
Okamura, Kazuo; Koyama, Satoshi; Maeda, Tadayuki; and Kamihigoshi, Tutomu, 4,684,591, Cl. 429-218.000.
Daimler-Benz Aktiengesellschaft: *See—*
Foerster, Hans-Joachim, 4,683,972, Cl. 180-142.000.
Dainippon Ink and Chemicals, Inc.: *See—*
Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, 4,684,601, Cl. 430-284.000.
Dainippon Screen Mfg. Co., Ltd.: *See—*
Hirosawa, Makoto, 4,684,979, Cl. 358-75.000.
Yamada, Mitsuhiko, 4,684,978, Cl. 358-75.000.
Dalebout, William T.; Vassoughi, Sohrab; Martinell, William J.; Rohrer, David C.; Martinell, Steven W.; and Marchant, Robert L., to Pro Form, Inc. General purpose exercise machine. 4,684,126, Cl. 272-134.000.
Dalton, Edward L., Jr. Method of making a laminated printing plate. 4,684,429, Cl. 156-323.000.
Damiron, Pierre M.; and Legoupil, Jean-Luc, to Clecim. Process and device for bringing a strip traveling in a liquid into contact with a diverting roll. 4,684,451, Cl. 204-141.500.
Dana Corporation: *See—*
Hilker, Gregory J.; and Tieman, Edward A., 4,683,775, Cl. 74-710.000.
Nelsen, Christopher P.; and Melton, Robert L., 4,683,753, Cl. 73-655.000.
Danguy des Deserts, Loic M. J.; Michel, Dominique; and Sedillot, Francois G., to Doris Engineering. Oscillating platform on flexible piles for work at sea. 4,684,292, Cl. 405-202.000.
Danielson, Lincoln V.: *See—*
Beck, Willi K.; Danielson, Lincoln V.; and Strange, Andrew, 4,684,769, Cl. 200-61.890.
Darda, Helmut; and Schoch, Reinhold. Spring drive for toy vehicles. 4,683,986, Cl. 185-39.000.
Darden, Bruce V.: *See—*
Anderson, Jerry M.; Cannon, Thomas C., Jr.; Darden, Bruce V.; and Smith, Donald T., 4,684,195, Cl. 439-404.000.
D'Arrigo, Joseph S. Surfactant mixtures, stable gas-in-liquid emulsions, and methods for the production of such emulsions from said mixtures. 4,684,479, Cl. 252-307.000.
Darsow, Gerhard; and Biedermann, Wolfgang, to Bayer Aktiengesellschaft. Process for the preparation of a mixture of α-D-glucopyranosido-1,6-mannitol and α-D-glucopyranosido-1,6-sorbitol from α-D-glucopyranosido-1,6-fructose. 4,684,720, Cl. 536-124.000.
Data General Corporation: *See—*
Lemone, Lou; Faletra, Salvatore; McDaniel, John R.; and Caldara, Steve, 4,685,057, Cl. 364-200.000.
Small, Larry A., 4,684,934, Cl. 340-712.000.
Smitt, Eric L.; and Collins, Robert J., 4,685,124, Cl. 379-95.000.
Davenport, James M., to American Hospital Supply Corp. IOL loop retention package and method. 4,684,014, Cl. 206-5.100.
David R. Webb Co., Inc.: *See—*
Weil, George, 4,683,926, Cl. 144-178.000.
Davis, Dave A. Collapsible game blind. 4,683,672, Cl. 43-1.000.
Davis, Thomas E., to Cerline Ceramic Corporation. Pipe elbow with abrasion resistant composite inner liner and method for forming. 4,684,155, Cl. 285-16.000.
Dayco Products, Inc.: *See—*
Kleykamp, Donald L., 4,684,418, Cl. 156-91.000.
Dayton, Birney D.; and Bannister, Richard, to Grass Valley Group, Inc., The. Monolithic switch with selective latch control. 4,684,823, Cl. 307-247.00R.
DDRS, Inc.: *See—*
Sanderford, Hugh B., Jr., 4,684,945, Cl. 340-825.560.
De La Rue Systems Limited: *See—*
Lane, Martin, 4,684,119, Cl. 271-4.000.
Deal, James F., III: *See—*
Hayes, Michael E.; Hrebenar, Kevin R.; Murphy, Patricia L.; Futch, Laurence E., Jr.; Deal, James F., III; and Bolden, Paul L., Jr., 4,684,372, Cl. 44-51.000.
Deambrosio, Carlos A., to Electrovert Limited. Vibratory wave soldering. 4,684,056, Cl. 228-180.100.
De Baere, Luc, to Ateliers de Constructions Electriques de Charleroi. Process and installation for anaerobic digestion. 4,684,468, Cl. 210-603.000.
DeBell, Gary W.; Wright, David L.; Ruddock, Kenneth A.; Petersen, Alan B.; Carlson, Lee R.; and von Gunten, Marc K., to Spectra-Physics, Inc. Optical component of a laser. 4,685,110, Cl. 372-103.000.
Deets, Gary L.; and Tamalis, William G., to Akzo N.V. Cationic grafted starch copolymers. 4,684,708, Cl. 527-312.000.
de Koning, Adrianus J.; Loontjens, Jacobus A.; Mostert, Hubertus A. M.; and Omloo, Hubertus A. A., to DSM Resins B.V. Compositions containing maleimide-amide compounds as well as the preparation and application thereof. 4,684,706, Cl. 526-262.000.
Delaware Capital Formation, Inc.: *See—*
Tomczak, Roman M.; Evans, Alfred J.; Chen, Grant K. R.; and Brinson, Edward P., 4,683,615, Cl. 17-1.00R.
DeLima, Daniel D. Wave-propelled marine vessel. 4,684,350, Cl. 440-9.000.
Delong, Robert W.: *See—*
Hartman, William J., Sr., 4,684,834, Cl. 310-24.000.
Del Signore, James R., II, to NCR Corporation. Dot matrix print head energy control circuit. 4,683,817, Cl. 101-93.030.
Delta Elettronica s.r.l.: *See—*
Memmola, Serafino, 4,683,774, Cl. 74-501.00R.
Demejo, Lawrence P.: *See—*
Bonser, Steven M.; Bugner, Douglas E.; and Demejo, Lawrence P., 4,684,596, Cl. 430-110.000.
deMey, Charles F., II, to Perkin-Elmer Corporation, The. Frictionless translational bearing for optical instrument element. 4,684,811, Cl. 250-561.000.
Demont, Allan S., to 501 Keene Corp. Cutting apparatus. 4,683,791, Cl. 83-874.000.
Demont, Allen. Cutting apparatus. 4,683,792, Cl. 83-874.000.
Demura, Hajime: *See—*
Funakawa, Naoyoshi; Demura, Hajime; and Nagamori, Nobuyuki, 4,684,297, Cl. 407-41.000.
Den Besten, Leroy E.; and Pinkerton, Cletis P. Cutter bit device. 4,684,176, Cl. 299-91.000.
Denk, Winfried: *See—*
Bednorz, Johannes G.; Denk, Winfried; Lanz, Martin; and Pohl, Wolfgang D., 4,684,206, Cl. 350-96.120.
Dennison Manufacturing Company: *See—*
Shuman, Ralph J.; and Burns, Barbara, 4,684,685, Cl. 524-270.000.
Denny, Christopher G.; and Harvey, Brian J. Syringe for the remote injection of animals and fish. 4,684,366, Cl. 604-130.000.
Derbyshire, George C., to Jacobs Manufacturing Company, Limited, The. Drill chuck. 4,684,139, Cl. 279-62.000.
Derleth, James L.; and Ciminelli, Michael A., to Xerox Corporation. Low cost manometer. 4,683,756, Cl. 73-747.000.

Derr, W. Rodman, Jr.; Garwood, William E.; Kuo, James C.; Leib, Tiberiu M.; Nace, Donald M.; and Tabak, Samuel A., to Mobil Oil Corporation. Process for upgrading wax from Fischer-Tropsch synthesis. 4,684,756, Cl. 585-330.000.

Deseret Medical, Inc.: *See*—
Taller, Robert A.; and McGary, Charles W., Jr., 4,684,490, Cl. 264-296.000.

De Shon, Dennis A. Buoyancy engine utilizing pistons and crankshaft. 4,683,720, Cl. 60-496.000.

Desmond, James L.; and Locastro, Joseph L. Weight exercise cuff and attachments. 4,684,122, Cl. 272-119.000.

DeSoto, Inc.: *See*—
Higginbotham, Clark A.; and Wichmann, James W., 4,684,677, Cl. 523-435.000.

deSouza, Antonio S., to Dunmore Corporation. Flexible electroluminescent film laminate. 4,684,353, Cl. 445-51.000.

Detter, Gary C.: *See*—
Klembus, Nancy M.; and Detter, Gary C., 4,684,188, Cl. 339-59.00M.

Deutsch-Franzosisches Forschungsinstitut Saint-Louis: *See*—
Bauer, Francois, 4,684,337, Cl. 425-135.000.

Deutsch, Ralph, to Kawai Musical Instrument Mfg. Co., Ltd. Data reduction for a musical instrument using stored waveforms. 4,683,793, Cl. 84-1.010.

Deutsche Gardner-Denver GmbH: *See*—
Polzer, Bernhard; and Roemischer, Johann, 4,685,050, Cl. 364-152.000.

Deutsche Thomson-Brandt GmbH: *See*—
Maier, Gerhard, 4,685,150, Cl. 455-183.000.

Deutz-Allis Corporation: *See*—
Busboom, Garry W., 4,684,068, Cl. 239-665.000.

Devaney, Walter E., to Boeing Company, The. Method for making graded I-III-VI_2 semiconductors and solar cell obtained thereby. 4,684,761, Cl. 136-258.000.

Devello AB: *See*—
Jarund, Erik, 4,684,018, Cl. 206-306.000.

Deveson, Daniel A.; and Bawcutt, Anthony J., to Mitel Corporation. Interface circuit for remote control of a PABX. 4,685,122, Cl. 379-90.000.

Dewilde, Carl: *See*—
Segal, Henry P.; and Dewilde, Carl, 4,685,101, Cl. 370-84.000.

De Wit, Hendrik J.; Brouha, Marcel; Enz, Ulrich E.; Jager, Kornelis; Van Der Borst, Albertus J. C.; and Turk, Gijsbertus W., to U.S. Philips Corporation. Magnetic head with anisotropy in plane of core ports. 4,685,012, Cl. 360-125.000.

Dextec Metallurgical Pty. Ltd.: *See*—
Everett, Peter K., 4,684,450, Cl. 204-118.000.

Dhein, Rolf: *See*—
Meyer, Rolf-Volker; Fahnler, Friedrich; Dhein, Rolf; and Michael, Dietrich, 4,684,746, Cl. 564-38.000.

Dhuyvetter, Timothy A., to Signetics Corporation. Temperature and process variation compensation for a delta demodulation decoder. 4,684,898, Cl. 329-104.000.

Diamond, Gary. Robotic device. 4,683,773, Cl. 74-479.000.

Diasonics, Inc.: *See*—
Bliehall, James C., 4,684,894, Cl. 324-318.000.

Dibbern, John E., Jr.; and Moores, Gregory E., to Black & Decker Inc. Electrical contacts for a switch. 4,684,774, Cl. 200-275.000.

Dickerson, Bobby V.: *See*—
Smith, Dale K.; Donich, Thomas G.; Dickerson, Bobby V.; and Leader, Raymond E., 4,685,149, Cl. 455-56.000.

Dickson-Wright, Edward A.; and Lacey, Derick A., to Package Control Limited. Load transporting apparatus. 4,684,311, Cl. 414-535.000.

Dicky, John, to Columbus McKinnon Corporation. Shredded tire oversize scrap return elevator. 4,684,070, Cl. 241-79.300.

Dicky, John, to Columbus McKinnon Corporation. Unitized machine for shredding waste automotive vehicle tires. 4,684,071, Cl. 241-80.000.

Diefenbach, Horst; Dobbelstein, Arnold; and Hille, Hans-Dieter, to BASF Farben & Fasern AG. Binders for cathodically depositable coating compositions, a process for their preparation, and their use. 4,684,676, Cl. 523-411.000.

Diehl GmbH & Co.: *See*—
Arnold, Werner; Grasser, Hans; Kruger, Tilmann; and Meisner, Alfred, 4,684,261, Cl. 368-107.000.

Diem, Hans: *See*—
Kraus, Friedrich; Matthias, Guenther; Wittmann, Otto; and Diem, Hans, 4,684,690, Cl. 524-419.000.

Diesel Kiki Co., Ltd.: *See*—
Sugiura, Hiroyuki, 4,683,725, Cl. 62-199.000.

Dill, James M., to Gray, Rita Ann. Unauthorized personnel detection system. 4,684,933, Cl. 340-572.000.

Dill, Walter R.: *See*—
Walker, Michael L.; Ford, William G. F.; Dill, Walter R.; and Gdanski, Ricky D., 4,683,954, Cl. 166-307.000.

Diller, Calvin D.; and Burke, Michael J., to Tektronix, Inc. Low impedance switched attenuator. 4,684,881, Cl. 323-354.000.

Di Natale, Claude A.: *See*—
Allgaier, Wayne F.; Tyjenski, Gerard M.; and Di Natale, Claude A., 4,684,432, Cl. 156-500.000.

Dinger, Horst; and Moosmann, Horst, to Gebruder Junghans GmbH. Safety device for a projectile fuse. 4,683,823, Cl. 102-229.000.

Dirkin, William; and Feldt, Gary, to Pneumo Abex Corporation. Clevis connection. 4,684,280, Cl. 403-157.000.

Dischert, Robert A.; Ader, Joseph R.; and Topper, Robert J., to RCA Corporation. Luminance/chrominance separation circuitry. 4,684,977, Cl. 358-31.000.

DiStefano, Thomas H.; Hollis, Ralph L., Jr.; Johnson, Mark; and Wang, Sherman S., to International Business Machines Corporation. Format patterning method for magnetic recording media. 4,684,547, Cl. 427-131.000.

Dittmann, Michael, to Siemens Aktiengesellschaft. Electromagnetic relay. 4,684,909, Cl. 335-128.000.

Dittmann, Michael; and Stadler, Heinz, to Siemens Aktiengesellschaft. Armature retaining spring and coil flange contact chamber for an electromagnetic relay. 4,684,910, Cl. 335-274.000.

Dobbelstein, Arnold: *See*—
Diefenbach, Horst; Dobbelstein, Arnold; and Hille, Hans-Dieter, 4,684,676, Cl. 523-411.000.

Dobbertin, Dennis. Tool for seating flooring panels. 4,683,631, Cl. 29-278.000.

Dobner, Michael H.: *See*—
Clark, James A.; and Dobner, Michael H., 4,684,225, Cl. 350-518.000.

Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See*—
Ziegler, Hermann, 4,683,694, Cl. 52-208.000.

Doherty, Paul D.: *See*—
Clark, Roger A.; Doherty, Paul D.; and Tolnar, Emil J., Jr., 4,684,190, Cl. 439-587.000.

Doi, Akihiko: *See*—
Ando, Hideo; and Doi, Akihiko, 4,684,797, Cl. 250-201.000.

Doi, Nobuo: *See*—
Matsuura, Masahiko; Doi, Nobuo; Yoshioka, Sadashichi; Okimoto, Haruo; and Ueda, Kazuhiko, 4,683,856, Cl. 123-436.000.

Doi, Yoshiki; Inabe, Mitsuo; and Noro, Osamu, to Kawasaki Jukogyo Kabushiki Kaisha. Heat activated heat pump. 4,683,723, Cl. 62-6.000.

Dolph, Michael W.: *See*—
Rice, Steven J.; Thompson, Gilbert M.; Dolph, Michael W.; and Montoya, Daniel D., 4,684,259, Cl. 366-185.000.

DoMinh, Thap; Fleming, James C.; and Lindstrom, Michael J., to Eastman Kodak Company. Photoresist compositions containing quinone sensitizer. 4,684,599, Cl. 430-270.000.

Don Fell Limited & Donfab Investments, Inc.: *See*—
Takeuchi, Seiji; and Anger, Byron H., 4,684,026, Cl. 206-522.000.

Donelon, John J.; Tomkiewicz, Yaffa; Wassick, Thomas A.; and Yeh, James T., to International Business Machines Corporation. Selective metal etching in metal/polymer structures. 4,684,437, Cl. 156-643.000.

Donich, Thomas G.: *See*—
Smith, Dale K.; Donich, Thomas G.; Dickerson, Bobby V.; and Leader, Raymond E., 4,685,149, Cl. 455-56.000.

Doris Engineering: *See*—
Danguy des Deserts, Loic M. J.; Michel, Dominique; and Sedillot, Francois G., 4,684,292, Cl. 405-202.000.

Dorner Mfg. Corp.: *See*—
Dorner, Wolfgang C., 4,684,308, Cl. 414-96.000.

Dorner, Wolfgang C., to Dorner Mfg. Corp. Stacker assembly for a conveyor system. 4,684,308, Cl. 414-96.000.

Dorsey, Boyd: *See*—
Miller, Arthur O.; Coleman, Hollis; Atkinson, Roger; and Dorsey, Boyd, 4,685,127, Cl. 379-221.000.

Dougherty, John J.: *See*—
Martellock, Paul T.; Dougherty, John J.; and Lund, Nora A., 4,685,024, Cl. 361-93.000.

Douglas, William A.; and Ozer, Theodore, to Boeing Company, The. Universal holding fixture. 4,684,113, Cl. 269-21.000.

Dove, George B.; and Mitra, Gautam, to Miles Laboratories, Inc. Method of separating proteins from aqueous solutions. 4,684,723, Cl. 530-351.000.

Dow Chemical Company, The: *See*—
Dunbar, Joseph E.; and Hedstrand, David M., 4,684,398, Cl. 71-98.000.
Duquette, Lawrence G.; and Garrou, Philip E., 4,684,729, Cl. 544-357.000.
Hunter, Douglas L., 4,684,667, Cl. 521-32.000.
Klimpel, Richard R.; and Hansen, Robert D., 4,684,459, Cl. 209-166.000.
Mendoza, Abel, 4,684,752, Cl. 568-779.000.
Moore, Stanley E., 4,684,619, Cl. 502-330.000.
Peters, Thomas L.; and Stevens, Timothy S., 4,684,470, Cl. 210-639.000.
Rogers, Richard B.; and Goring, Cleve A. I., 4,684,394, Cl. 71-90.000.
Swearingen, Loren L.; Earls, Jimmy D.; and LaTulip, Randy J., 4,684,693, Cl. 524-600.000.
Tabor, Ricky L.; and Allen, James A., 4,684,576, Cl. 428-441.000.
Wang, Chun S.; Chen, Wuu N.; Bowden, Robert L.; and Berman, Jody R., 4,684,700, Cl. 525-481.000.
Wang, Chun S.; Bowden, Robert L.; and Chen, Wuu N., 4,684,701, Cl. 525-507.000.

Downing, Elizabeth A.; and Downing, Ronald W. Soft contact lens analyzer. 4,684,246, Cl. 356-124.000.

Downing, James H.: *See*—
Lee, Young E.; Downing, James H.; and Kaiser, Robert H., 4,684,403, Cl. 75-80.000.

Downing, Ronald W.: *See*—
Downing, Elizabeth A.; and Downing, Ronald W., 4,684,246, Cl. 356-124.000.

Downs, Daniel C.: *See—*
Joannou, Kyriacos; and Downs, Daniel C., 4,685,013, Cl. 360-121.000.
Doyle, James H. Automatic equalizer. 4,684,886, Cl. 324-132.000.
Drackett Company, The: *See—*
Lewis, John C., Jr., 4,684,283, Cl. 403-299.000.
Dragerwerk AG: *See—*
Leichnitz, Kurt, 4,684,380, Cl. 55-274.000.
Drake, Brian L.: *See—*
Palazzolo, Faro D.; Drake, Brian L.; and Swanson, Ralph R., 4,683,801, Cl. 89-40.120.
Drake, Charles A., to Phillips Petroleum Company. Catalyst compositions useful for olefin isomerization and disproportionation. 4,684,760, Cl. 585-670.000.
Drake, Evelyn N.: *See—*
Eustace, Daniel J.; Siano, Donald B.; Drake, Evelyn N.; and Calcavecchio, Peter, 4,683,953, Cl. 166-294.000.
Dreamland Electrical Appliances PLC: *See—*
Cole, Graham M., 4,684,785, Cl. 219-212.000.
Dresser Industries, Inc.: *See—*
Afimiwala, Khurshid A., 4,683,810, Cl. 92-212.000.
Hultgren, Claes L., 4,683,985, Cl. 184-6.120.
Pennison, Robert A., 4,683,682, Cl. 51-170.00R.
Sankey, Edwin W., 4,684,854, Cl. 318-140.000.
Stark, Robert A., 4,684,004, Cl. 192-87.130.
Drewek, David F., to General Motors Corporation. Controlled collapsible frame rail. 4,684,151, Cl. 280-784.000.
Driscoll, Carleton D.; Najm, Elie M.; and Waechter, Manfred, to International Business Machines Corp. Shutdown circuit for blocking oscillator power supply. 4,685,020, Cl. 361-18.000.
Drolet, Denis; Burchmore, William; and Drolet, Leo , to Inclasco Corporation Ltd. Ice hockey stick. 4,684,130, Cl. 273-67.00A.
Drolet, Leo : *See—*
Drolet, Denis; Burchmore, William; and Drolet, Leo , 4,684,130, Cl. 273-67.00A.
Drugesult, Lionel: *See—*
Barrere, Genevieve C.; Beydon, Marie-Helene; Drugesult, Lionel; and Vasseur, Jean-Pierre, 4,684,613, Cl. 435-301.000.
Drummond, George: *See—*
Kappas, Attallah; and Drummond, George, 4,684,637, Cl. 514-185.000.
DSM Resins B.V.: *See—*
de Koning, Adrianus J.; Loontjens, Jacobus A.; Mostert, Hubertus A. M.; and Omloo, Hubertus A. A., 4,684,706, Cl. 526-262.000.
Dubke, Robert E.: *See—*
Brown, Mark W.; and Dubke, Robert E., 4,684,936, Cl. 340-721.000.
Dubois, Jean: *See—*
Roy, Jehan; and Dubois, Jean, 4,684,171, Cl. 297-47.000.
Dubost, Dominique, to Rapid S.A. Fastening clip device. 4,684,305, Cl. 411-174.000.
Dubroeucq, Marie-Christine; Le Fur, Gerard R.; and Renault, Christian L. A., to Rhone-Poulenc Sante. Pharmaceutical compositions containing naphthalene-and azanaphthalene-carboxamide derivatives, new naphthalene-and azanaphthalene-carboxamide derivatives and process for their preparation. 4,684,652, Cl. 514-254.000.
Dubrosky, Harry A., to General Motors Corporation. Rotary coupler for a robot. 4,683,912, Cl. 137-580.000.
Duchenois, Valere; Fouassier, Michele; and Baudry, Hugues, to U.S. Philips Corporation. Luminescent screen having restored cavities and display tube having such a screen. 4,684,846, Cl. 313-475.000.
Duchin, Daniel, to Monarch Marking Systems, Inc. Tag dispensing and attaching method and apparatus. 4,683,635, Cl. 29-432.000.
Duddy, Gerald J.: *See—*
Henderson, James A.; Travlos, Constantine M.; Ferris, David S.; Duddy, Gerald J.; and Mercier, Roland F., 4,683,636, Cl. 29-564.600.
Dufford, Edward L.: *See—*
Chang, Wen-Hsuan; Blackburn, William P.; Prucnal, Paul J.; and Dufford, Edward L., 4,684,697, Cl. 525-100.000.
Duffour et Igon S.A. (D.I.): *See—*
Vigneau, Jean-Louis; Trenque, Pierre; and Rivoire, Bruno, 4,683,905, Cl. 137-329.100.
Dufour, Marcel, to Cofpa. Method for steaming a papermaker's fabric. 4,683,624, Cl. 28-141.000.
Dull, Henry F., Jr.: *See—*
Buchanan, Robert L.; and Dull, Henry F., Jr., 4,684,672, Cl. 523-100.000.
Dumont, Alain, to Schlumberger Technology Corporation. Method and apparatus for the acoustic inspection of a borehole fitted with casing. 4,685,092, Cl. 367-35.000.
Dunbar, Donald D., to Inside Outfitters, Inc. Motor driven shade lowering and raising mechanism for atrium walls. 4,683,933, Cl. 160-273.00R.
Dunbar, Joseph E.; and Hedstrand, David M., to Dow Chemical Company, The. Herbicidal cyanoguanidines and cyanoisothioureas. 4,684,398, Cl. 71-98.000.
Dunmore Corporation: *See—*
deSouza, Antonio S., 4,684,353, Cl. 445-51.000.
Duo-Fast Corporation: *See—*
Potucek, Frank R., 4,684,022, Cl. 206-347.000.
Duonghong, Dung: *See—*
Graetzel, Michael; Serpone, Nick; and Duonghong, Dung, 4,684,537, Cl. 427-53.100.
Du Pont de Nemours, E. I., and Company: *See—*
Coq, Jean L., 4,684,577, Cl. 428-447.000.
Hodge, James D.; and Lee, Kiu-Seung, 4,684,409, Cl. 106-311.000.
Kinoshita, Toshio; and Hiyama, Naoki, 4,684,183, Cl. 439-77.000.
Levitt, George, 4,684,395, Cl. 71-92.000.
Lou, Gene W., 4,684,568, Cl. 428-265.000.
Shapiro, Rafael, 4,684,393, Cl. 71-90.000.
Vassiliou, Eustathios, 4,684,551, Cl. 427-345.000.
Werjefelt, Bertil, 4,683,880, Cl. 128-201.280.
Duquette, Lawrence G.; and Garrou, Philip E., to Dow Chemical Company, The. Polyethylene polypiperazine compositions. 4,684,729, Cl. 544-357.000.
Durham, Timothy N. Apparatus for housing and deploying a radar detector in an automotive vehicle. 4,684,164, Cl. 296-37.700.
Durr, Manfred: *See—*
Schulz, Volker; Leyck, Sigurd; Durr, Manfred; Ghyczy, Miklos; Wendel, Armin; and Hager, Jorg, 4,684,632, Cl. 514-78.000.
Dykstra, Raymond C., to Cobe Laboratories, Inc. Pinch valve. 4,684,102, Cl. 251-7.000.
Dynagram Corporation of America: *See—*
Valentine, William, 4,684,534, Cl. 427-3.000.
Dysarz, Edward D. Device and method to set and salvage structures. 4,683,832, Cl. 114-258.000.
E. R. Squibb & Sons, Inc.: *See—*
Atwal, Karnail, 4,684,655, Cl. 514-274.000.
Atwal, Karnail, 4,684,656, Cl. 514-274.000.
Ondetti, Miquel A.; and Pluscec, Josip, 4,684,660, Cl. 514-423.000.
Sundeen, Joseph E., 4,684,722, Cl. 540-203.000.
Earls, Jimmy D.: *See—*
Swearingen, Loren L.; Earls, Jimmy D.; and LaTulip, Randy J., 4,684,693, Cl. 524-600.000.
Eastern Company, The: *See—*
Weinerman, Lee S.; Rachocki, Michael J.; and Giarrizzo, John E., 4,683,736, Cl. 70-208.000.
Eastman Kodak Company: *See—*
Barrett, Harold J., 4,685,000, Cl. 358-332.000.
Baumeister, Hans P., 4,684,995, Cl. 358-227.000.
Baumeister, Hans-Peter, 4,684,996, Cl. 358-231.000.
Bonser, Steven M.; Bugner, Douglas E.; and Demejo, Lawrence P., 4,684,596, Cl. 430-110.000.
Brown, James W.; Chen, Tsang J.; and Schen, Michael A., 4,684,608, Cl. 430-629.000.
DoMinh, Thap; Fleming, James C.; and Lindstrom, Michael J., 4,684,599, Cl. 430-270.000.
Harder, John W., 4,684,604, Cl. 430-375.000.
Krishnamurthy, Sundaram, 4,684,606, Cl. 430-546.000.
Lee, Hsien-Che, 4,685,071, Cl. 364-526.000.
Lelental, Mark; Lee, James K.; and VanKerkhove, Alan P., 4,684,602, Cl. 430-363.000.
Lussier, Barbara B., 4,684,597, Cl. 430-190.000.
Martin, William A., 4,685,001, Cl. 358-342.000.
Maskasky, Joe E., 4,684,607, Cl. 430-567.000.
Minor, James C., 4,684,243, Cl. 355-14.0SH.
Moberg, Gregory O., 4,684,824, Cl. 307-270.000.
Remley, Herbert D., 4,684,605, Cl. 430-537.000.
Schultz, Peter G., 4,684,242, Cl. 355-15.000.
Tamary, Ernest J., 4,684,784, Cl. 219-216.000.
Eaton Corporation: *See—*
Calviello, Joseph A., 4,683,642, Cl. 437-40.000.
Light, Gerard M.; Rocco, LeRoy E.; and Clancey, Stephen M., 4,683,999, Cl. 192-58.00B.
Oehlke, Donald N., 4,683,622, Cl. 24-458.000.
Reinicke, Robert H., 4,684,365, Cl. 604-126.000.
Ebeling, Olavi; and Lunden, Risto, to Oy Kontekla. Draining arrangement for roof. 4,683,685, Cl. 52-12.000.
Eberhardt, Wolfgang U.: *See—*
Abeles, Benjamin; Eberhardt, Wolfgang U.; and Tiedje, J. Thomas, 4,684,565, Cl. 428-220.000.
Ebisawa, Isao: *See—*
Hirosawa, Toshiaki; Akiyama, Yoshie; Ebisawa, Isao; Hattori, Yoshifumi; and Abe, Tsutomu, 4,684,962, Cl. 346-140.00R.
Ebrahim, Sajjad; and Hexamer, Donald K., to Par-Pak Limited. Cover for baked goods. 4,684,024, Cl. 206-464.000.
Eckberg, Richard P.; Striker, Richard A.; and Modic, Frank J., to General Electric Company. Ultraviolet radiation-curable silicone release compositions. 4,684,670, Cl. 522-13.000.
Eckenhoff, James B.; Cortese, Richard; and Landrau, Felix A., to ALZA Corporation. Rate controlled dispenser for administering beneficial agent. 4,684,524, Cl. 424-469.000.
Eckle, Otto, to Komet Stahlhalter- und Werkzeugfabrik. Machine tool spindle and tool holder. 4,684,301, Cl. 409-232.000.
Ecolab Inc.: *See—*
Pedersen, Daniel E.; and Hatcher, Herbert J., 4,684,469, Cl. 210-632.000.
Edelson, Richard L., to Bourke, Frederic A., Jr.; Bourke, Eleanor F.; Edelson, Richard L.; and Edelson Trust, The. Method and system for externally treating the blood. 4,683,889, Cl. 128-395.000.
Edelson, Richard L., to Bourke, Frederic A., Jr.; Bourke, Eleanor F.; and Edelson, Richard L. Method and system for externally treating the blood. 4,684,521, Cl. 424-101.000.
Edelson Trust, The: *See—*
Edelson, Richard L., 4,683,889, Cl. 128-395.000.
Edging, Thomas E.: *See—*
Stewart, John M.; Clark, Teddy R.; and Edging, Thomas E., 4,684,512, Cl. 423-321.00R.
Edo Corporation/Fiber Science Division: *See—*
Brooks, John C., 4,684,423, Cl. 156-156.000.

Edstrom, Carl W.; Fedele, Daniel E.; and Lazar, Martin, to Raytheon Company. Apparatus for delaying printer bail closing. 4,684,277, Cl. 400-639.100.

Edwards, Carson P.; Huisjen, Martin A.; and Munson, Robert E., to Ball Corporation. Microwave/seismic security system. 4,684,929, Cl. 340-541.000.

Egawa, Akira: *See—*
Kodaira, Takanori; Namai, Akihiro; and Egawa, Akira, 4,684,233, Cl. 354-400.000.

Egelhof, Dieter: *See—*
Meinecke, Albrecht; Schmid, Hans-Rainer; and Egelhof, Dieter, 4,684,444, Cl. 162-380.000.

Eggleston, Dean E., to Central Plastics Company. Thermoplastic fitting electric welding method and apparatus. 4,684,789, Cl. 219-497.000.

Egly, Robert A. Diskette storage container. 4,684,019, Cl. 206-309.000.

Egner, Walter A.; and Collins, Daniel R., to AMP Incorporated. Frangible pulling bullet. 4,684,161, Cl. 294-1.100.

Eikenberry, Eric J.: *See—*
Hemphill, John K.; and Eikenberry, Eric J., 4,684,612, Cl. 435-240.500.

Einarson, Jeffrey W.: *See—*
Cheung, Kin L.; and Einarson, Jeffrey W., 4,685,082, Cl. 365-49.000.

Ektelon: *See—*
Mortvedt, Raymond L., 4,684,131, Cl. 273-73.00F.

El Paso Products Company: *See—*
Ficker, Harold K.; and Teskin, Frederick M., 4,684,683, Cl. 524-220.000.

Elam, Paul A.; and Keller, Jack W., to Goodyear Aerospace Corporation. Locking configuration for a wheel rim flange retaining ring. 4,683,930, Cl. 152-410.000.

Eldon Industries, Inc.: *See—*
Bates, Donald L., 4,683,670, Cl. 40-620.000.

Electric Power Research Institute, Inc.: *See—*
Yie, Gene G., 4,683,684, Cl. 51-429.000.

Electronic Concepts, Inc.: *See—*
Lavene, Bernard, 4,685,026, Cl. 361-308.000.

Electronic Instrumentation and Technology: *See—*
May, Joe T.; and Hale, Steven D., 4,685,074, Cl. 364-564.000.

Electrovert Limited: *See—*
Deambrosio, Carlos A., 4,684,056, Cl. 228-180.100.

Electrovoice, Inc.: *See—*
Watson, Alan R.; and Bryson, Michael A., 4,685,137, Cl. 381-174.000.

Elektro Automaten Verstraeten p.v.b.a.: *See—*
Verstraeten, Achiel, 4,684,128, Cl. 273-1.0GC.

Elektroschmelzwerk Kempten GmbH: *See—*
Lipp, Alfred; Reinmuth, Klaus; and von Struensee, Detlef, 4,684,480, Cl. 252-478.000.

Elevator GmbH: *See—*
Kahkipuro, Matti, 4,684,856, Cl. 318-310.000.

ELF France: *See—*
Bossand, Bernard; Eppe, Jacques; Faure, Alain; and Leygue, Gilles, 4,684,391, Cl. 71-24.000.

Eli Lilly and Company: *See—*
Buddenbaum, Harry C.; and Robison, Robert L., 4,684,643, Cl. 514-204.000.
Robertson, David W., 4,684,748, Cl. 514-619.000.

Elkem Metals Company: *See—*
Lee, Young E.; Downing, James H.; and Kaiser, Robert H., 4,684,403, Cl. 75-80.000.

Ellis, Stafford M., to GEC Avionics Limited. Angular position sensors. 4,684,249, Cl. 356-152.000.

Elloway, Russell: *See—*
Aldridge, Robert E.; Elloway, Russell; Fritz, William O.; Goff, Ralph D.; and Herrera, Michael J., 4,684,863, Cl. 318-599.000.

Elscint Ltd.: *See—*
Fenster, Paul; and Shimoni, Yair, 4,685,146, Cl. 382-54.000.

Eltron Research, Inc.: *See—*
Sammells, Anthony F., 4,684,590, Cl. 429-194.000.

Emhart Industries, Inc.: *See—*
Coash, Ronald J., 4,684,853, Cl. 318-16.000.
Winzer, Frederick W., 4,684,390, Cl. 65-133.000.

Emmerich, Claude L.: *See—*
Schaffer, Irving; and Emmerich, Claude L., 4,684,367, Cl. 604-140.000.

Emoto, Masami; and Inuzuka, Hideo, to Ricoh Company, Ltd. Focus detection method involving cutting more than half of light beam reflected from disc. 4,684,799, Cl. 250-201.000.

Energy Conversion Devices, Inc.: *See—*
Reyes, Jaime; and Allred, David, 4,685,030, Cl. 361-400.000.

Energy Machinery: *See—*
Cloud, John A., 4,684,467, Cl. 210-519.000.

Engdahl, Paul D.; and Engdahl, Roger P., to Engdahl, Paul D. Seismic displacement recorder for base-isolated structures. 4,684,958, Cl. 346-7.000.

Engdahl, Roger P.: *See—*
Engdahl, Paul D.; and Engdahl, Roger P., 4,684,958, Cl. 346-7.000.

Engelhard Corporation: *See—*
Needham, Eric, 4,685,019, Cl. 361-2.000.

Engman, Sonja A.: *See—*
Lindblom, Karl P. C.; and Engman, Sonja A., 4,684,253, Cl. 356-333.000.

Enichem Sintesi, S.p.A.: *See—*
Greco, Alberto; Busetto, Carlo; Cassar, Luigi; and Neri, Carlo, 4,684,726, Cl. 544-69.000.

Enso-Gutzeit Oy: *See—*
Simanainen, Jyrki, 4,683,816, Cl. 100-121.000.

Entriken, Raymond A.: *See—*
Nelson, Roy A.; Entriken, Raymond A.; and Grieves, Randolph C., 4,684,072, Cl. 241-172.000.

Entringer, Guy P.: *See—*
Vorachek, Michael J.; Entringer, Guy P.; Meives, Otis E.; Lynch, Gary L.; and Lutzke, Anthony J., 4,683,704, Cl. 53-461.000.

Environmental Research Institute of Michigan: *See—*
McCubbrey, David; and Friedman, Theron, 4,685,144, Cl. 382-49.000.

Enz, Ulrich E.: *See—*
De Wit, Hendrik J.; Brouha, Marcel; Enz, Ulrich E.; Jager, Kornelis; Van Der Borst, Albertus J. C.; and Turk, Gijsbertus W., 4,685,012, Cl. 360-125.000.

Eppe, Jacques: *See—*
Bossand, Bernard; Eppe, Jacques; Faure, Alain; and Leygue, Gilles, 4,684,391, Cl. 71-24.000.

Eppstein, Deborah A.; Fraser-Smith, Elizabeth; and Matthews, Thomas R., to Syntex (U.S.A.) Inc. Method for enhancing the anti-infective activity of muramyldipeptide derivatives. 4,684,625, Cl. 514-19.000.

Epworth Manufacturing Co., Inc.: *See—*
Nelson, Roy A.; Entriken, Raymond A.; and Grieves, Randolph C., 4,684,072, Cl. 241-172.000.

Equipements Automobiles Marchal: *See—*
Perraudin, Hubert A., 4,683,785, Cl. 82-1.00C.

Eralp, Emin: *See—*
Johansson, Nils E.; Eralp, Emin; and Itil, Turan M., 4,683,892, Cl. 128-639.000.

Erdt, Wolfgang; Reitberger, Rudolf; and Stocker, Erwin, to Hilti Aktiengesellschaft. Drill stand with a guide column. 4,684,303, Cl. 409-235.000.

Ericson, Kjell: *See—*
Andersson, Lars; Glanvall, Rune; Ericson, Kjell; and Lundberg, Anders, 4,684,330, Cl. 417-360.000.

Ernst, Donald M.; and Toth, Jerome E., to Thermacore, Inc. Unidirectional heat pipe. 4,683,940, Cl. 165-32.000.

Errani, Deo, to Costruzioni Italiane Serrature Affini C.I.S.A. S.p.A. Cylinder lock with key, incorporating a picking preventing means. 4,683,740, Cl. 70-419.000.

Ersfeld, Dean A.; Sandvig, Timothy C.; and Gobran, Diane S., to Minnesota Mining and Manufacturing Company. Orthopedic casting article and method. 4,683,877, Cl. 128-90.000.

Erste Wiener Wach- und Schliessgesellschaft AG: *See—*
Kamhuber, Peter, 4,684,793, Cl. 235-449.000.

Erwin Sick GmbH Optik-Electronik: *See—*
Sackmann, Karl H.; and Anselment, Christoph, 4,684,768, Cl. 200-61.430.

Escher, James C., to Gyro-Flex Corporation. Precessional exercising device. 4,684,124, Cl. 272-128.000.

Essmyer, John L.: *See—*
Keusch, Preston; and Essmyer, John L., 4,684,558, Cl. 428-40.000.

Este, Grantley O.; Suthers, Mark S.; Streater, Richard W.; and MacLaurin, Blair K., to Northern Telecom Limited. Saw devices including resistive films. 4,684,841, Cl. 310-313.00B.

ETA S.A. Fabriques d'Ebauches: *See—*
Etienne, Georges, 4,684,263, Cl. 368-220.000.
Meister, Pierre-Andre , 4,684,262, Cl. 368-157.000.

Etienne, Georges, to ETA S.A. Fabriques d'Ebauches. Magnetic brake for timepiece. 4,684,263, Cl. 368-220.000.

Eustace, Daniel J.; Siano, Donald B.; Drake, Evelyn N.; and Calcavecchio, Peter, to Exxon Research and Engineering Company. Shear thickening compositions containing polyacrylic acid and polyacrylamide, their preparation and use. 4,683,953, Cl. 166-294.000.

Evans, Alfred J.; and Sarginger, Francis E., to Tipper Tie, Inc. Cut-off mechanism for clip attachment apparatus. 4,683,700, Cl. 53-138.00R.

Evans, Alfred J.: *See—*
Tomczak, Roman M.; Evans, Alfred J.; Chen, Grant K. R.; and Brinson, Edward P., 4,683,615, Cl. 17-1.00R.

Evans, Ben E.: *See—*
Chang, Raymond S. L.; and Evans, Ben E., 4,684,646, Cl. 514-221.000.

Evans, Morris L., to Exxon Chemical Patents Inc. Low color, high softening point aromatic resin and method for its production. 4,684,707, Cl. 526-290.000.

Evans, Timothy W., to Upjohn Company, The. Process for converting 1,2-saturated steroids to 1,2-dehydro steroids. 4,684,610, Cl. 435-61.000.

Everett, Lynn E., to Tusco Manufacturing Co. Adjustable bracket assembly. 4,684,094, Cl. 248-245.000.

Everett, Peter K., to Dextec Metallurgical Pty. Ltd. Production of zinc from ores and concentrates. 4,684,450, Cl. 204-118.000.

Eves, E. Eugene, II; and Maher, Thomas F., to Raytheon Company. Product support tray for microwave processing. 4,684,777, Cl. 219-10.55A.

Eveson, Anthony C., to Radyne Limited. Coating billets for forging. 4,683,742, Cl. 72-43.000.

Ewbank, Michael E.; and Heitz, Steven, to Sundstrand Corporation. Charging and ejection system for rankine apparatus. 4,683,722, Cl. 60-656.000.

Ewen, A. T. E.; and Stone, J. P., to Glynwed Tubes and Fittings Limited. Method of making a fusion pad. 4,684,428, Cl. 156-257.000.

Ex-Cell-O Corporation: *See—*
Fitzpatrick, Paul, 4,683,743, Cl. 72-88.000.
Hinman, Edmund R., 4,684,455, Cl. 204-212.000.

Rangwala, Badrudden K.; Rodocker, Frank A.; Pawloski, Curtis H.; and Joosten, Richard L., 4,683,701, Cl. 53-167.000.

Exxon Chemical Patents Inc.: *See—*
Evans, Morris L., 4,684,707, Cl. 526-290.000.

Exxon Production Research Co.: *See—*
Chung, Jing-Yau; Chen, Sen-Tsuen; Wainerdi, James C.; and Miller, Mark A., 4,685,091, Cl. 367-31.000.

Exxon Research and Engineering Company: *See—*
Abeles, Benjamin; Eberhardt, Wolfgang U.; and Tiedje, J. Thomas, 4,684,565, Cl. 428-220.000.
Bock, Jan; Brownawell, Darrell W.; Gutierrez, Antonio; Robbins, Max L.; Shaub, Harold; and Steyn, Peter L., 4,684,473, Cl. 252-49.800.
Eustace, Daniel J.; Siano, Donald B.; Drake, Evelyn N.; and Calcavecchio, Peter, 4,683,953, Cl. 166-294.000.
Peiffer, Dennis G.; Lundberg, Robert D.; Sedillo, Lawrence; and Newlove, John C., 4,683,952, Cl. 166-293.000.

Ezure, Tadayoshi; and Sekiguchi, Shigemi, to Hosiden Electronics Co., Ltd. Connector plug. 4,684,199, Cl. 439-610.000.

Fabre, Jean-Louis; Farge, Daniel; James, Claude; and Lave, Daniel, to Rhone-Poulenc Sante. Anti-thrombotic ortho-condensed pyrrole derivatives, compositions, and method of use therefor. 4,684,658, Cl. 514-338.000.

Fabry, Jonn J. Exercise garment. 4,684,123, Cl. 272-119.000.

Fag Kugelfischer Georg Schafer (KGaA): *See—*
Mittendorf, Gerhard, 4,684,005, Cl. 192-98.000.

FAHET NV: *See—*
Rief, Dieter, 4,683,599, Cl. 4-490.000.

Fahnler, Friedrich: *See—*
Meyer, Rolf-Volker; Fahnler, Friedrich; Dhein, Rolf; and Michael, Dietrich, 4,684,746, Cl. 564-38.000.

Faletra, Salvatore: *See—*
Lemone, Lou; Faletra, Salvatore; McDaniel, John R.; and Caldara, Steve, 4,685,057, Cl. 364-200.000.

Fanberg, Victor V. Car door opening tool and method. 4,683,783, Cl. 81-15.900.

Fanuc Ltd: *See—*
Hattori, Kiyoshi; and Usuda, Eiji, 4,685,053, Cl. 364-184.000.
Kawamura, Hideaki; and Otsuki, Toshiaki, 4,684,861, Cl. 318-567.000.
Kinoshita, Mitsuo; and Obara, Haruki, 4,685,064, Cl. 364-474.000.

Faraone, Lorenzo, to RCA Corporation. Method of making a floating gate memory cell. 4,683,640, Cl. 437-41.000.

Farge, Daniel: *See—*
Fabre, Jean-Louis; Farge, Daniel; James, Claude; and Lave, Daniel, 4,684,658, Cl. 514-338.000.

Faria, Sixdeniel; and Karam, Ronald E., to GTE Products Corporation. Cadmium carbonate/cadmium sulfide photoconductor. 4,684,595, Cl. 430-94.000.

Farmitalia Carlo Erba S.p.A.: *See—*
Bargiotti, Alberto; Caruso, Michele; Suarato, Antonino; Penco, Sergio; and Giuliani, Fernando, 4,684,629, Cl. 514-34.000.

Farmos-Yhtyma Oy: *See—*
Karjalainen, Arto J.; and Kurkela, Kauko O. A., 4,684,659, Cl. 514-396.000.

Farrar, Frank W. Recoil shock pad. 4,683,671, Cl. 42-74.000.

Fastner, Thorwald; Mayrhofer, Max; and Taschner, Walter, to Voest-Alpine Aktiengesellschaft. Method of producing a plate of steel. 4,684,053, Cl. 228-158.000.

Faul, Thomas L., to Barclay Horticulture Mfg. Ltd. Compost bin. 4,683,674, Cl. 47-83.000.

Faure, Alain: *See—*
Bossand, Bernard; Eppe, Jacques; Faure, Alain; and Leygue, Gilles, 4,684,391, Cl. 71-24.000.

Fedders Machine and Tools Co., Inc.: *See—*
Feddersen, Frederick J., 4,684,012, Cl. 198-803.010.

Feddersen, Frederick J., to Fedders Machine and Tools Co., Inc. Blow molding pallet assembly. 4,684,012, Cl. 198-803.010.

Fedele, Daniel E.: *See—*
Edstrom, Carl W.; Fedele, Daniel E.; and Lazar, Martin, 4,684,277, Cl. 400-639.100.

Feher, Michael S.; Weidler, Charles H.; and Wise, James H., to AMP Incorporated. Electrical terminal and electrical connector assembly. 4,684,191, Cl. 439-246.000.

Feinberg, Alixandra. Garment for convalescents. 4,683,594, Cl. 2-105.000.

Feinberg, David A., to University of California, The Regents of the. Rapid magnetic resonance imaging using multiple phase encoded spin echoes in each of plural measurement cycles. 4,684,891, Cl. 324-309.000.

Fejes, Julius, to Flo-Tork, Inc. Rotary actuator having integral piston assembly with floating rack. 4,683,805, Cl. 92-129.000.

Feldman, Louis W.; and Yawn, David H., to Cardiovascular Systems, Inc. Centrifuge. 4,684,361, Cl. 494-41.000.

Feldt, Gary: *See—*
Dirkin, William; and Feldt, Gary, 4,684,280, Cl. 403-157.000.

Fenster, Paul; and Shimoni, Yair, to Elscint Ltd. Automatic misregistration correction. 4,685,146, Cl. 382-54.000.

Ferag AG: *See—*
Hansch, Egon, 4,684,116, Cl. 270-54.000.
Honegger, Werner; and Hansch, Egon, 4,684,117, Cl. 270-54.000.

Ferguson, Frank: *See—*
Ferguson, Frank W.; and Herrity, Kenneth R., 4,684,349, Cl. 434-308.000.

Ferguson, Frank W.; and Herrity, Kenneth R., to Ferguson, Frank. Audio-visual teaching system and method. 4,684,349, Cl. 434-308.000.

Ferguson, Robert W.; Andors, Derik K.; and Reed, E. Smith, Jr., to Vermont Castins, Inc. Wood burning stove having glass cleaning system. 4,683,868, Cl. 126-193.000.

Fernbacher, John M.; and Hansel, James G., to Air Products and Chemicals Inc. Process and apparatus for monitoring and controlling the flammability of gas from an in-situ combustion oil recovery project. 4,683,947, Cl. 166-251.000.

Ferrari, Harry M.: *See—*
Wilson, John F.; Gjertsen, Robert K.; and Ferrari, Harry M., 4,684,504, Cl. 376-447.000.

Ferrero, Pietro, to Ferrero S.p.A. Dragee and method for its manufacture. 4,684,523, Cl. 424-441.000.

Ferrero S.p.A.: *See—*
Ferrero, Pietro, 4,684,523, Cl. 424-441.000.

Ferris, David S.: *See—*
Henderson, James A.; Travlos, Constantine M.; Ferris, David S.; Duddy, Gerald J.; and Mercier, Roland F., 4,683,636, Cl. 29-564.600.

Fetouh, Mohamed A., to General Motors Corporation. Split bearing assemblies. 4,684,267, Cl. 384-294.000.

Fetsch, Rudolf, to Unima Maschinenbau GmbH. Pipe saddle. 4,684,086, Cl. 248-68.100.

Fey, Edmond O.; Haselbauer, Peter; Jung, Dae Y.; Kaschak, Ronald A.; Kilthau, Hans-Dieter; Magnuson, Roy H.; and Wagner, Robert J., to International Business Machines Corporation. Electroless plating with bi-level control of dissolved oxygen. 4,684,545, Cl. 427-98.000.

Fichtel & Sachs Industries: *See—*
Lamond, Lee T.; and Staton, Richard D., 4,684,098, Cl. 248-407.000.

Ficker, Harold K.; and Teskin, Frederick M., to El Paso Products Company. Injection blow molding grade propylene polymers. 4,684,683, Cl. 524-220.000.

Field, Robert E., to United Technologies Corporation. Film cooling passages with curved corners. 4,684,323, Cl. 416-97.00R.

Fields, Davis S., Jr., to International Business Machines Corporation. Two-module-read, read-after-write, bi-directional tape drive. 4,685,005, Cl. 360-53.000.

Fields, Roy A. Light signal for door knob and lock assembly. 4,683,741, Cl. 70-432.000.

Fife, Robert M.; Ross, Dennis; and Shaw, Richard F., to Texas Instruments Incorporated. Edgeboard connector. 4,685,031, Cl. 361-413.000.

Filenet Corporation: *See—*
Rudy, Michael; Cary, Paul; Anderson, Gary S.; and Roth, Arthur A., 4,685,095, Cl. 369-36.000.

Filonov, Alexandr D.: *See—*
Kostylev, Alexandr D.; Ivinsky, Vasily I.; Filonov, Alexandr D.; and Klimashko, Vladimir V., 4,683,960, Cl. 173-91.000.

Filter, Reinhard: *See—*
Kortschinski, Juri; Mintz, John D.; and Filter, Reinhard, 4,685,021, Cl. 361-42.000.

Fingermatrix, Inc.: *See—*
Schiller, Michael, 4,685,145, Cl. 382-52.000.

Finnigan Corporation: *See—*
Johnson, Bruce S.; and Taylor, Dennis M., 4,684,204, Cl. 439-863.000.

Firestone Tire & Rubber Company, The: *See—*
Bryant, Lynn A.; Roberts, Durward T., Jr.; Beckman, Joseph A.; Tazewell, Joseph H.; and Cetnar, James F., 4,684,420, Cl. 156-116.000.
Kay, Edward L.; and Gutierrez, Richard, 4,684,715, Cl. 528-493.000.
Shurman, Louis W.; and Bryant, Lynn A., 4,684,431, Cl. 156-394.100.

First Brands Corporation: *See—*
Leung, Pak S.; and Matulewicz, William N., 4,684,474, Cl. 252-75.000.
Matulewicz, William N., 4,684,475, Cl. 252-75.000.

Fisher Dynamics Corporation: *See—*
Bell, Robert L., 4,684,174, Cl. 297-367.000.

Fisher, Ina E.; and Raney, Richard C. X-ray shield for fluorescent light tube. 4,684,810, Cl. 250-515.100.

Fisher, John L.: *See—*
Macemon, Herbert J.; Schlake, Randall L.; Fisher, John L.; Piatt, Clair E.; and Mohney, Hubert L. R., 4,683,919, Cl. 140-92.200.

Fitzgerald, Joseph F.: *See—*
Sawyer, Philip N.; and Fitzgerald, Joseph F., 4,684,364, Cl. 604-123.000.

Fitzpatrick, Mark E.: *See—*
Tsui, Cyrus; Chan, Andrew K. L.; Chan, Albert; Fitzpatrick, Mark E.; and Ansari, Zahid, 4,684,830, Cl. 307-465.000.

Fitzpatrick, Paul, to Ex-Cell-O Corporation. Apparatus and method for roll sizing diameters. 4,683,743, Cl. 72-88.000.

Flakt Aktiebolag: *See—*
Larsson, Bertil, 4,683,699, Cl. 52-775.000.

Flamme, Jean M.: *See—*
Leroy, Andre; and Flamme, Jean M., 4,683,605, Cl. 15-250.210.

Flanigen, Edith M.: *See—*
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,684,617, Cl. 502-214.000.

Flatman, Richard J.: *See—*
Wright, William B.; and Flatman, Richard J., 4,683,716, Cl. 60-226.100.

Fleiter, Lothar: *See—*
Stahl, Hans G.; Hohlein, Peter; Traenckner, Hans-Joachim; Fleiter, Lothar; and Schwindt, Jurgen, 4,684,691, Cl. 524-534.000.

Fleming, Graham C., to Atlantic Richfield Company. Enhanced oil recovery process employing carbon dioxide. 4,683,948, Cl. 166-263.000.

Fleming, James C.: *See—*
DoMinh, Thap; Fleming, James C.; and Lindstrom, Michael J., 4,684,599, Cl. 430-270.000.

Fletcher, Stephen R.: *See—*
Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J.; and Fletcher, Stephen R., 4,684,653, Cl. 514-258.000.

Flexcon Company, Inc.: *See—*
Pennace, John R.; and Quinn, Sharon A., 4,684,557, Cl. 428-40.000.

Flinchbaugh, Bruce E., to Texas Instruments Incorporated. System and method for displaying, and interactively excavating and examining a three dimensional volume. 4,685,070, Cl. 364-522.000.

Flo-Tork, Inc.: *See—*
Fejes, Julius, 4,683,805, Cl. 92-129.000.

Floyd Bell Associates, Inc.: *See—*
Zofan, Ely S.; and Thurston, Marlin O., 4,684,927, Cl. 340-384.00E.

Fluoroware, Inc.: *See—*
Niebling, Tracy J.; and Bieger, Walter I., 4,684,021, Cl. 206-334.000.

Foerster, Hans-Joachim, to Daimler-Benz Aktiengesellschaft. Steering system with auxiliary force assist for vehicles in which a central steering limit valve is connected with the pump pressure line of a steering assist pump. 4,683,972, Cl. 180-142.000.

Fok, Wilson W.; and Moussouris, John P., to International Business Machines Corporation. RLL (1,7) encoder with single state bit. 4,684,921, Cl. 340-347.0DD.

Foley, Henry C.; and O'Toole, Michael P., to American Cyanamid Company. Bimetallic catalysts for the reaction of carbon monoxide and hydrogen and method of making the catalysts. 4,684,618, Cl. 502-313.000.

Folgero, Kare: *See—*
Archenholtz, Ake; and Folgero, Kare, 4,684,109, Cl. 266-216.000.

Follansbee Steel Corporation: *See—*
Meriwether, Jon D., 4,683,833, Cl. 114-267.000.

Forchheimer, Robert; and Odmark, Anders. Device for an array of photo diodes arranged in a matrix. 4,684,991, Cl. 358-213.110.

Ford, Frank G.: *See—*
Barnsdale, William J., Jr.; and Ford, Frank G., 4,685,056, Cl. 364-200.000.

Ford, Michael A., to Perkin-Elmer Corporation, The. Interferometric optical path difference scanners and FT spectrophotometers incorporating them. 4,684,255, Cl. 356-346.000.

Ford Motor Company: *See—*
Boaz, Premakaran T., 4,684,388, Cl. 65-24.000.
Boaz, Premakaran T., 4,684,389, Cl. 65-24.000.
Hoffman, David W.; and Kukla, Cassimer M., 4,683,758, Cl. 73-780.000.
Sale, Robert F.; and Wells, Wayne E., 4,684,110, Cl. 267-52.000.
Watanabe, Shunso F., 4,683,992, Cl. 188-299.000.

Ford, William G. F.: *See—*
Walker, Michael L.; Ford, William G. F.; Dill, Walter R.; and Gdanski, Ricky D., 4,683,954, Cl. 166-307.000.

Fornuto, Joseph; Gifford, William E.; and Meyer, Karen M., to General Motors Corporation. Fuel vapor storage canister. 4,683,862, Cl. 123-520.000.

Forrester, John S.: *See—*
Cullingford, Christopher V.; Forrester, John S.; and Smith, Gerald B., 4,683,746, Cl. 73-118.100.

Forsmo, Sten: *See—*
Allen, Anthony P.; Forsmo, Sten; and Langley, John G., 4,684,549, Cl. 427-221.000.

Forsyth, Thomas C., III: *See—*
Kline, Leonard J., Jr.; and Forsyth, Thomas C., III, 4,684,835, Cl. 310-59.000.

Fory, Werner: *See—*
Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, 4,684,730, Cl. 544-408.000.

Foster, Donald D.; and Hills, Robert N., to Realex Corporation. Shipping seal for viscous product dispenser. 4,684,043, Cl. 222-386.000.

Foster, Donald D., to Realex Corporation. Viscous product dispenser having externally located, dispensed product shearing outlet valve provided with lost-motion action. 4,684,044, Cl. 222-386.000.

Foster, Donald D.; and Nelson, Phil L., to Realex Corporation. Unit dose liquid dispenser having precise dosage capabilities. 4,684,046, Cl. 222-451.000.

Fouassier, Michele: *See—*
Duchenois, Valere; Fouassier, Michele; and Baudry, Hugues, 4,684,846, Cl. 313-475.000.

Foundation: The Research Institute of Electric and Magnetic Alloys, The: *See—*
Masumoto, Hakaru; Sawaya, Showhachi; and Hinai, Masakatsu, 4,684,414, Cl. 148-11.5R.
Masumoto, Hakaru; and Nakamura, Naoji, 4,684,416, Cl. 148-430.000.

FRAGEMA: *See—*
Gravelle, Alain, 4,684,493, Cl. 376-252.000.

Framatome: *See—*
Morin, Jean-Xavier, 4,683,840, Cl. 122-4.00D.

Framatome & Cie.: *See—*
Dagard, Philippe, 4,684,494, Cl. 376-313.000.
Morin, Jean-Xavier; and Marcellin, Michel, 4,684,375, Cl. 48-197.00R.

France, Michael G.; Geannopoulos, George L.; Bosnyak, Robert J.; and Chan, Steve Y., to Monolithic Memories, Inc. Programmable asynchronous register initialization circuit. 4,684,826, Cl. 307-272.00A.

Franciosi, Alfonso, to University of Minnesota, Regents of the. Samarium-promoted oxidation of silicon and gallium arsenide surfaces. 4,684,541, Cl. 437-173.000.

Francis, Gilbert. Toilet paper dispenser. 4,684,075, Cl. 242-55.420.

Franklin Electric Co., Inc.: *See—*
Schaefer, Edward J.; and George, Kenneth D., 4,684,837, Cl. 310-87.000.

Franks, Theodore E., to Hitco. Composite stud. 4,684,304, Cl. 411-171.000.

Frantz, Gene A.: *See—*
Lin, Kun-Shan; Goudie, Kathleen M.; and Frantz, Gene A., 4,685,135, Cl. 381-52.000.

Fraser-Smith, Elizabeth: *See—*
Eppstein, Deborah A.; Fraser-Smith, Elizabeth; and Matthews, Thomas R., 4,684,625, Cl. 514-19.000.

Fravolini, Arnaldo: *See—*
Mascellani, Giuseppe; Fravolini, Arnaldo; and Terni, Patrizia, 4,684,647, Cl. 514-222.000.

Freeman, Jerry H. Slip ring assembly for method of making same. 4,684,179, Cl. 439-27.000.

Freeman, William R.: *See—*
Brinegar, John R.; and Freeman, William R., 4,684,505, Cl. 420-81.000.

Frei, Urs; Richter, Harald; and Stait, Donald, to Contraves AG. Individual sheet feeder device for printer. 4,684,276, Cl. 400-630.000.

French, Daniel B.; Brookshire, Richard E.; and Schnelle, Joseph W., to Cincinnati Milacron Inc. Control system for program controlled manipulator having multiple triggered functions between programmed points. 4,685,067, Cl. 364-513.000.

Fricker, Hans, to Sulzer Brothers Limited. Receiver for solar energy. 4,683,872, Cl. 126-449.000.

Fried. Krupp GmbH: *See—*
Kolaska, Johannes; and Reiter, Norbert, 4,684,405, Cl. 75-240.000.

Friedman, Theron: *See—*
McCubbrey, David; and Friedman, Theron, 4,685,144, Cl. 382-49.000.

Friedrich, Karl: *See—*
Stockmar, Jurgen; and Friedrich, Karl, 4,683,997, Cl. 192-58.00C.

Friis, Nils: *See—*
Wagner, Burkhard E.; Karol, Frederick J.; Goeke, George L.; Jorgensen, Robert J.; and Friis, Nils, 4,684,703, Cl. 526-88.000.

Frish, Michael B.; Nebolsine, Peter E.; and Pirri, Anthony N., to Physical Sciences, Inc. Method for bonding using laser induced heat and pressure. 4,684,781, Cl. 219-121.0LU.

Fritz, William O.: *See—*
Aldridge, Robert E.; Elloway, Russell; Fritz, William O.; Goff, Ralph D.; and Herrera, Michael J., 4,684,863, Cl. 318-599.000.

Fritzsche, Donald E., to Hobart Corporation. Cleaning and drying apparatus and method for the recirculation system of a high efficiency deep fat fryer. 4,684,412, Cl. 134-19.000.

Fuchs, Paul: *See—*
Antes, Gregor; Halder, Mathis; Fuchs, Paul; and Gehr, Peter, 4,685,138, Cl. 382-12.000.

Fuji Jukogyo Kabushiki Kaisha: *See—*
Sugiura, Katsuhiko, 4,683,863, Cl. 123-568.000.

Fuji Kagakushi Kogyo Co., Ltd.: *See—*
Watanabe, Hiroaki, 4,684,272, Cl. 400-242.000.

Fuji Photo Film Co., Ltd.: *See—*
Matsuda, Terumi; and Tamura, Kaoru, 4,684,592, Cl. 430-6.000.
Seshimoto, Osamu; Nirasawa, Mituharu; Terashima, Masaaki; and Saito, Yoshio, 4,684,445, Cl. 204-1.00T.
Utsugi, Mikio, 4,684,229, Cl. 354-106.000.

Fuji Xerox Co., Ltd.: *See—*
Inoue, Yoshio; and Aoki, Matsuyuki, 4,684,236, Cl. 355-3.0DD.
Inui, Toshiharu; Moriguchi, Haruhiko; Hisatake, Masayuki; and Ohmori, Takashi, 4,685,069, Cl. 364-506.000.

Fujii, Hiroshi: *See—*
Taketani, Toshinobu; Kuramori, Ken; Sakamoto, Sunji; and Fujii, Hiroshi, 4,683,651, Cl. 29-786.000.

Fujii, Tadashi: *See—*
Ona, Isao; Ozaki, Masaru; and Fujii, Tadashi, 4,684,709, Cl. 528-15.000.

Fujii, Yoshimasa: *See—*
Ishikawa, Haruo; and Fujii, Yoshimasa, 4,684,208, Cl. 350-96.150.

Fujikawa, Tetsuzo; Hirata, Makizo; and Tamba, Shinichi, to Kawasaki Jukogyo Kabushiki Kaisha. Valve system for overhead valve type four-cycle engine. 4,683,847, Cl. 123-90.200.

Fujimoto, Masashi; and Okazaki, Kazuo, to Mitsubishi Jukogyo Kabushiki Kaisha. Wire chain connector. 4,683,834, Cl. 114-294.000.

Fujimura, Setsuo: *See—*
Matsuura, Yutaka; Sagawa, Masato; and Fujimura, Setsuo, 4,684,406, Cl. 75-244.000.

Fujisaki, Kiyonori; and Kobayashi, Toshio. Structure of electric motor and production method thereof. 4,684,839, Cl. 310-154.000.

Fujisaku, Kiminori; Awaga, Makoto; and Mori, Shosuke, to Fujitsu Limited. Combined graphic and textual display system. 4,684,935, Cl. 340-717.000.

Fujita, Etsumi: *See—*
Toyoshima, Masakatsu; Hideshima, Yasuhiro; and Fujita, Etsumi, 4,684,981, Cl. 358-86.000.

Fujita, Toshiji: *See—*
Masuda, Toshiro; Ishizuka, Kouichi; Fujita, Toshiji; and Kinoshita, Yoshio, 4,685,139, Cl. 382-1.000.

Fujitsu Limited: *See*—
Fujisaku, Kiminori; Awaga, Makoto; and Mori, Shosuke, 4,684,935, Cl. 340-717.000.
Hattori, Toshihiro; Uchiyama, Nobuichi; Asagi, Yasuyoshi; Ogawa, Noriaki; and Kasai, Hitoshi, 4,683,996, Cl. 192-0.033.
Hattori, Toshihiro; Shishido, Katsuya; Kasai, Hitoshi; Moride, Shigeki; and Ogawa, Noriaki, 4,685,051, Cl. 364-424.100.
Otsuka, Akira; Shinoda, Tsutae; Horio, Kenji; and Tanioka, Tsuyoshi, 4,684,849, Cl. 315-169.400.
Sugishima, Kenji; and Yasuda, Hiroshi, 4,684,315, Cl. 414-749.000.
Tetsu, Sadayuki; and Tanishima, Yasuo, 4,685,034, Cl. 361-424.000.

Fujiwara, Shuetsu; Andoh, Naoki; and Hosotani, Kenji, to Japan Synthetic Rubber Co., Ltd. Process for producing benzophencne tetracarboxylic dianhydride. 4,684,738, Cl. 549-242.000.

Fukami, Harukazu: *See*—
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, 4,684,651, Cl. 514-253.000.
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, 4,684,739, Cl. 549-350.000.

Fukushima, Masami: *See*—
Sogo, Yoshitaka; Fukushima, Masami; and Kuzuya, Tetsuro, 4,683,771, Cl. 74-467.000.

Fukushima, Yaichi: *See*—
Motai, Hiroshi; Fukushima, Yaichi; and Ishiyama, Takashi, 4,684,527, Cl. 426-46.000.

Fuldner, William V.; and Ganssle, Eugene R., to RCA Corporation. Spacecraft structure with symmetrical mass center and asymmetrical deployable appendages. 4,684,084, Cl. 244-168.000.

Fuller, Robert J.: *See*—
Yeh, Lun-Shu R.; Grenness, Morten; and Fuller, Robert J., 4,683,648, Cl. 29-623.500.

Funada, Fumiaki: *See*—
Kishi, Kohhei; Koden, Mitsuhiro; and Funada, Fumiaki, 4,684,435, Cl. 156-632.000.

Funakawa, Naoyoshi; Demura, Hajime; and Nagamori, Nobuyuki, to Sato Kogyo Co., Ltd.; and Hitachi Carbide Tools Ltd. Milling cutter for cutting the contaminated surface of concrete. 4,684,297, Cl. 407-41.000.

Funaki, Kiyoshi: *See*—
Ishihara, Koushi; Murakami, Yasuji; Yoshizawa, Nobuyuki; and Funaki, Kiyoshi, 4,684,213, Cl. 350-96.230.

Furbee, Avery D.; Pleil, Viktor W.; and Burke, James E., to Picker International, Inc. X-ray tube electron beam switching and biasing method and apparatus. 4,685,118, Cl. 378-114.000.

Furmanek, Robert A.; Mukherjee, Jyoti P.; and Lanese, Pasquale J., to Warner & Swasey Company, The. Slide and way assembly and method of making same. 4,684,266, Cl. 384-37.000.

Furukawa, Yoshito: *See*—
Kitano, Kisei; Ogawa, Tetsuya; Furukawa, Yoshito; Yoshida, Naoyuki; Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; and Nigorikawa, Kazunori, 4,684,476, Cl. 252-299.610.
Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Ogawa, Tetsuya; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,684,478, Cl. 252-299.630.

Furuta, Youichi: *See*—
Nishii, Michiharu; Furuta, Youichi; Tsubouchi, Kaoru; Murata, Takeo; Shibatani, Juichi; and Kiriyama, Takashi, 4,683,807, Cl. 92-169.000.

Furutsu, Akira, to Japan Bano'k Co., Ltd.; and Ben Clements & Sons, Inc. Banding machine. 4,683,920, Cl. 140-93.00A.

Furuya, Yuhki: *See*—
Tange, Kohsuke; Takahashi, Osamu; Furuya, Yuhki; and Harada, Akira, 4,683,644, Cl. 437-7.000.

Futamura, Kenichiro; and Ohtsu, Keiichiro, to Taiho Kogyo Kabushiki Kaisha; and Toyoda Jidoshokki Seisakusho. Swash plate type compressor shoe. 4,683,804, Cl. 92-71.000.

Futch, Laurence E., Jr.: *See*—
Hayes, Michael E.; Hrebenar, Kevin R.; Murphy, Patricia L.; Futch, Laurence E., Jr.; Deal, James F., III; and Bolden, Paul L., Jr., 4,684,372, Cl. 44-51.000.

G. Siempelkamp GmbH & Co.: *See*—
Walter, Karl, 4,684,489, Cl. 264-101.000.

GAF Corporation: *See*—
Barabas, Eugene S., 4,684,519, Cl. 424-80.000.
Barabas, Eugene S., 4,684,698, Cl. 525-326.900.
Moskowitz, Mark L., 4,684,688, Cl. 524-336.000.

Galli, Massimo, to Olivetti Synthesis, S.p.A. Channelled base member for divider panels. 4,683,695, Cl. 52-221.000.

Gambrell, David E., to Thermo Kinetics Industries, Inc. Air cleaner assembly. 4,684,379, Cl. 55-227.000.

Gamper & Co. AG: *See*—
Maeder, Rene; and Herzog, Albin, 4,683,918, Cl. 140-73.000.

Ganssle, Eugene R.: *See*—
Fuldner, William V.; and Ganssle, Eugene R., 4,684,084, Cl. 244-168.000.

Gardner, Richard N., to Minnesota Mining and Manufacturing Company. Sputtering process for making magnets optic alloy. 4,684,454, Cl. 204-192.200.

Gargano, William L. B. Parachute suspension line attachment structure. 4,684,082, Cl. 244-142.000.

Gargas, Eugene F., to Wooster Brush Company, The. Inlet valve assembly for paint sprayer. 4,684,334, Cl. 417-568.000.

Gargos, Gary. Power plant driven by waves. 4,684,815, Cl. 290-53.000.

Garrett Corporation, The: *See*—
Miller, Ralph A.; and Whitney, Harry B., 4,684,079, Cl. 244-137.200.

Garrett, James E.: *See*—
Carroll, Arthur B.; Hough, Stewart E.; Hunter, Paul R.; Carstedt, John K.; Shaw, Sam R.; and Garrett, James E., 4,684,801, Cl. 250-221.000.

Garrou, Philip E.: *See*—
Duquette, Lawrence G.; and Garrou, Philip E., 4,684,729, Cl. 544-357.000.

Garsee, Henry A.: *See*—
Butts, Gene A.; Garsee, Henry A.; Kelley, Charles D.; Petty, Bruce R.; and Pauley, James L., 4,684,244, Cl. 356-39.000.

Garwood, William E.: *See*—
Derr, W. Rodman, Jr.; Garwood, William E.; Kuo, James C.; Leib, Tiberiu M.; Nace, Donald M.; and Tabak, Samuel A., 4,684,756, Cl. 585-330.000.

Gary, Richard A.: *See*—
Klinedinst, Keith A.; and Gary, Richard A., 4,684,583, Cl. 429-48.000.

Gate S.p.A.: *See*—
Perosino, Alessandro, 4,684,324, Cl. 416-189.000.

Gaul, Herr K.; Mogler, Herr J.; and Wiedmann, Herr H., to Gebruder Mogler GmbH & Co. Device for tapping containers filled with liquid. 4,684,038, Cl. 222-89.000.

Gavrilovich, Charles D., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Power transmission arrangement for telecommunications systems. 4,685,129, Cl. 379-324.000.

Gawrisch, Wolfgang, to Hoechst Aktiengesellschaft. Process for the control of process parameters in the production of stretched foils. 4,684,487, Cl. 264-22.000.

Gazdag, Maria: *See*—
Nagy, Geza T.; Szepesi, Gabor; Gazdag, Maria; Papp nee Sziklay, Zsofia; and Burger, Kalman, 4,684,638, Cl. 514-185.000.

Gdanski, Ricky D.: *See*—
Walker, Michael L.; Ford, William G. F.; Dill, Walter R.; and Gdanski, Ricky D., 4,683,954, Cl. 166-307.000.

Geannopoulos, George L.: *See*—
France, Michael G.; Geannopoulos, George L.; Bosnyak, Robert J.; and Chan, Steve Y., 4,684,826, Cl. 307-272.00A.

Gebruder Junghans GmbH: *See*—
Dinger, Horst; and Moosmann, Horst, 4,683,823, Cl. 102-229.000.

Gebruder Mogler GmbH & Co.: *See*—
Gaul, Herr K.; Mogler, Herr J.; and Wiedmann, Herr H., 4,684,038, Cl. 222-89.000.

GEC Avionics Limited: *See*—
Ellis, Stafford M., 4,684,249, Cl. 356-152.000.

Geelen, Pierre M. L. Device for cooling a granular product. 4,683,665, Cl. 34-65.000.

Gehr, Peter: *See*—
Antes, Gregor; Halder, Mathis; Fuchs, Paul; and Gehr, Peter, 4,685,138, Cl. 382-12.000.

Gelardi, Anthony L.: *See*—
Swinburne, Stephen G.; and Gelardi, Anthony L., 4,685,017, Cl. 360-133.000.

Gelderie, Udo: *See*—
Breuer, Kornelia; Gelderie, Udo; Holzer, Gerhard; and Raedisch, Helmer, 4,684,694, Cl. 524-730.000.

General Battery Corporation: *See*—
Stewart, Jim L., 4,684,872, Cl. 320-45.000.
Stewart, Jimmy L., 4,684,887, Cl. 324-158.00R.

General Dynamics, Pomona Division: *See*—
Piesik, Edward T., 4,683,798, Cl. 89-1.816.

General Electric Company: *See*—
Bates, Gary M.; Haaf, William R.; and Ting, Sai-Pei, 4,684,696, Cl. 525-68.000.
Charles, Richard J.; Mitoff, Stephan P.; and Pasco, Wayne D., 4,684,446, Cl. 204-15.000.
Eckberg, Richard P.; Striker, Richard A.; and Modic, Frank J., 4,684,670, Cl. 522-13.000.
Greenhalgh, Milton, 4,684,790, Cl. 219-505.000.
Hepp, Leonard R., 4,684,686, Cl. 524-281.000.
Lee, Gim F., Jr.; and Olander, Walter K., 4,684,681, Cl. 524-127.000.
Lee, Gim F., Jr., 4,684,682, Cl. 524-141.000.
Martellock, Paul T.; Dougherty, John J.; and Lund, Nora A., 4,685,024, Cl. 361-93.000.
Miller, Timothy J. E.; Plunkett, Allan B.; and Steigerwald, Robert L., 4,684,867, Cl. 318-701.000.
Steigerwald, Robert L.; and Mistry, Keku M., 4,685,040, Cl. 363-17.000.
Wroczynski, Ronald J., 4,684,669, Cl. 521-90.000.

General Instrument Corp.: *See*—
Horne, Donald R., 4,685,131, Cl. 380-20.000.
Nickels, Richard C., Jr., 4,684,792, Cl. 235-384.000.

General Motors Corporation: *See*—
Abu-Isa, Ismat A., 4,684,382, Cl. 55-316.000.
Allgaier, Wayne F.; Tyjenski, Gerard M.; and Di Natale, Claude A., 4,684,432, Cl. 156-500.000.
Arnett, Richard K., 4,684,544, Cl. 427-96.000.
Beck, Lawrence R.; Kocjan, Andrew J.; Natoli, Richard A.; and Liguore, Louis J., 4,684,765, Cl. 174-68.500.
Berlinger, Gregory J.; and Speranza, Joseph J., 4,684,779, Cl. 219-121.0LD.
Booth, Thomas L.; Schlaps, Edgar H.; and Wilde, Ronald J., 4,683,975, Cl. 180-289.000.
Budinski, John A., 4,683,768, Cl. 74-411.500.
Carlson, Richard A., 4,684,818, Cl. 307-10.00R.

Clark, Roger A.; Doherty, Paul D.; and Tolnar, Emil J., Jr., 4,684,190, Cl. 439-587.000.
Cotter, David H.; Teerman, Richard F.; and Timmer, Robert C., 4,684,067, Cl. 239-533.300.
Drewek, David F., 4,684,151, Cl. 280-784.000.
Dubrosky, Harry A., 4,683,912, Cl. 137-580.000.
Fetouh, Mohamed A., 4,684,267, Cl. 384-294.000.
Fornuto, Joseph; Gifford, William E.; and Meyer, Karen M., 4,683,862, Cl. 123-520.000.
Haag, Ronald H.; and Schlaps, Edgar H., 4,684,819, Cl. 307-10.00R.
Heaston, Bruce A., 4,685,023, Cl. 361-88.000.
Hoffman, Donald E.; and McDonald, David B., 4,683,913, Cl. 137-625.400.
House, Ronnalee; and Kellams, Roger W., 4,684,202, Cl. 439-752.000.
Kanodia, Vinod L., 4,684,166, Cl. 296-146.000.
Klembus, Nancy M.; and Detter, Gary C., 4,684,188, Cl. 339-59.00M.
Klemen, Donald, 4,683,776, Cl. 74-765.000.
Kurtti, Gary R.; Ches, Gregory S.; Brender, David T.; and Senopole, John J., 4,684,077, Cl. 242-107.600.
Miller, Gary T., 4,683,765, Cl. 74-60.000.
Miller, Gary T.; Marker, Richard L.; and Marker, Ronald E., 4,683,803, Cl. 92-71.000.
Miller, Larry D., 4,684,153, Cl. 280-808.000.
Nehmer, Carl A.; and Hocken, Lary R., 4,684,866, Cl. 318-696.000.
Neumann, Bernhard, 4,684,216, Cl. 350-279.000.
Radomski, Thomas A., 4,684,814, Cl. 290-31.000.
Richardson, Truman R., 4,683,974, Cl. 180-274.000.
Shreve, John R.; and Kearney, Mark B., 4,684,877, Cl. 323-269.000.
Shu-Ti Lee, Peter; Majkowski, Richard F.; and Partin, Dale L., 4,684,805, Cl. 250-343.000.
Thebert, Glenn W., 4,683,714, Cl. 60-39.020.
Trutter, Walter P., 4,684,175, Cl. 297-379.000.
Vahabzadeh, Hamid, 4,684,358, Cl. 474-148.000.
Wagner, Earl F.; and Smith, Charles M., 4,684,101, Cl. 249-144.000.
Weber, Frederick C., 4,684,279, Cl. 403-136.000.
Westercamp, Kenneth L.; Kurecka, Donald J.; and Yeack, David C., 4,683,971, Cl. 180-79.100.

Genicom Corporation: *See—*
Hewlett, Clarence W., Jr., 4,683,818, Cl. 101-93.040.

Genis, Johan C.: *See—*
Magrobi, Brian, 4,683,735, Cl. 70-168.000.

Gentili, Robert P.: *See—*
Harrison, David M.; Gentili, Robert P.; and Bellucci, George N., 4,683,922, Cl. 141-9.000.

Gentiluomo, Joseph A. Washing machine fluid discharge monitoring unit. 4,684,327, Cl. 417-38.000.

George, David L.; and Benson, Raymond G., Jr., to Uniden Corp. of America. Transceiver battery charging apparatus and method. 4,684,870, Cl. 320-20.000.

George, Dennis L. Keeper for machine tools and the like. 4,684,302, Cl. 409-233.000.

George, Kenneth D.: *See—*
Schaefer, Edward J.; and George, Kenneth D., 4,684,837, Cl. 310-87.000.

Geoservices: *See—*
Issenmann, Olivier, 4,684,946, Cl. 340-855.000.

Geosource Inc.: *See—*
Vitringa, Frederick A.; and Hagedoorn, Arend L., 4,685,094, Cl. 367-183.000.

Geskin, Ernest S.; and Bozzelli, Joseph W. Method of waste disposal, and apparatus for the same. 4,684,402, Cl. 75-51.500.

GET Communication Systems Corporation: *See—*
Chapman, Harry A.; and Lauson, David J., 4,684,885, Cl. 324-73.00R.

GFE Gesellschaft fur Elektrometallurgie mbH: *See—*
Hahn, Reinhard; and Andorfer, Hermann, 4,684,506, Cl. 420-552.000.

Ghibu, Michael; Hartel, Volker; Heynemann, Carl; and Raubach, Manfred, to Metzeler Kautschuk GmbH. Co-oscillating, volume-changing resonator in the form of a silencer. 4,683,979, Cl. 181-286.000.

Ghyczy, Miklos: *See—*
Schulz, Volker; Leyck, Sigurd; Durr, Manfred; Ghyczy, Miklos; Wendel, Armin; and Hager, Jorg, 4,684,632, Cl. 514-78.000.

Giarrizzo, John E.: *See—*
Weinerman, Lee S.; Rachocki, Michael J.; and Giarrizzo, John E., 4,683,736, Cl. 70-208.000.

Gibbs, Robert L. Cartridge launched - disk deployed chaff. 4,683,824, Cl. 102-436.000.

Gibson-Stephens Neuropharmaceuticals, Inc.: *See—*
Hruby, Victor J.; and Pelton, John T., 4,684,620, Cl. 514-11.000.

Gick, Wilhelm: *See—*
Kessen, Gunther; Cornils, Boy; Gick, Wilhelm; Wiebus, Ernst; Hibbel, Joseph; Bach, Hanswilhelm; and Zgorzelski, Wolfgang, 4,684,750, Cl. 568-883.000.

Gifford, William E.: *See—*
Fornuto, Joseph; Gifford, William E.; and Meyer, Karen M., 4,683,862, Cl. 123-520.000.

Gilardini S.p.A.: *See—*
Lupo, Elio, 4,684,168, Cl. 296-217.000.

Gill, Michael J., to Brookes & Gatehouse Limited. Speed measurement device. 4,685,093, Cl. 367-89.000.

Ginzburg, Vladimir B.; and Kaplan, Naum M., to Wean United Rolling Mills, Inc.; and International Rolling Mill Consultants, Inc. Flexible edge roll. 4,683,744, Cl. 72-243.000.

Giordano, Raymond L., to RCA Corporation. Transistor base current regulator. 4,684,878, Cl. 323-279.000.

Giorgio, Brazzale: *See—*
Sbalchiero, Carlo; and Giorgio, Brazzale, 4,683,649, Cl. 29-726.000.

Giroflex Entwicklungs AG: *See—*
Locher, Hermann, 4,684,173, Cl. 297-300.000.

Giuliani, Fernando: *See—*
Bargiotti, Alberto; Caruso, Michele; Suarato, Antonino; Penco, Sergio; and Giuliani, Fernando, 4,684,629, Cl. 514-34.000.

Gjertsen, Robert K.; and Wilson, John F., to Westinghouse Electric Corp. Burnable absorber rod releasable latching structure. 4,684,499, Cl. 376-446.000.

Gjertsen, Robert K.; Shallenberger, John M.; and Wilson, John F., to Westinghouse Electric Corp. Guide thimble captured locking tube in a reconstitutable fuel assembly. 4,684,500, Cl. 376-446.000.

Gjertsen, Robert K.: *See—*
Wilson, John F.; Gjertsen, Robert K.; and Cerni, Samuel, 4,684,495, Cl. 376-352.000.
Wilson, John F.; and Gjertsen, Robert K., 4,684,502, Cl. 376-446.000.
Wilson, John F.; Gjertsen, Robert K.; and Ferrari, Harry M., 4,684,504, Cl. 376-447.000.

Gladden, John R.: *See—*
Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., 4,684,321, Cl. 415-202.000.

Gladfelter, Harry F., to Raychem Corp. Shielding fabric. 4,684,762, Cl. 174-36.000.

Glanvall, Rune: *See—*
Andersson, Lars; Glanvall, Rune; Ericson, Kjell; and Lundberg, Anders, 4,684,330, Cl. 417-360.000.

Glaser, Dieter, to PEG Perego-Pines S.p.A. Perambulator. 4,684,148, Cl. 280-647.000.

Glenn, Thomas P.: *See—*
Baer, Scott D.; and Glenn, Thomas P., 4,684,055, Cl. 228-180.100.

Glennon, Timothy F., to Sundstrand Corporation. Hybrid generating system. 4,684,873, Cl. 322-47.000.

Glock, Alfred, to SKF Textilmaschinen-Komponenten GmbH. Thread monitoring device. 4,683,711, Cl. 57-81.000.

Glynwed Tubes and Fittings Limited: *See—*
Ewen, A. T. E.; and Stone, J. P., 4,684,428, Cl. 156-257.000.

Gnesa, Edward C. Road coating method and apparatus. 4,684,289, Cl. 404-75.000.

Gnutti, Giordano: *See—*
Gnutti, Giuliano; and Gnutti, Giordano, 4,684,037, Cl. 222-3.000.

Gnutti, Giuliano; and Gnutti, Giordano. Perfected mechanical control device for ball valve type valve systems. 4,684,037, Cl. 222-3.000.

Gobran, Diane S.: *See—*
Ersfeld, Dean A.; Sandvig, Timothy C.; and Gobran, Diane S., 4,683,877, Cl. 128-90.000.

Godfrey, John C., to Godfrey Science & Design, Inc. Flavor of zinc supplements for oral use. 4,684,528, Cl. 426-74.000.

Godfrey Science & Design, Inc.: *See—*
Godfrey, John C., 4,684,528, Cl. 426-74.000.

Goebel, Franz; and Batson, David C., to GTE Government Systems Corporation. Electrochemical cell with container support. 4,684,588, Cl. 429-115.000.

Goebel, Franz: *See—*
Batson, David C.; and Goebel, Franz, 4,684,587, Cl. 429-115.000.
Haskins, Timothy B.; Goebel, Franz; Batson, David C.; and Zuffante, Charles R., 4,684,586, Cl. 429-115.000.

Goeke, George L.: *See—*
Wagner, Burkhard E.; Karol, Frederick J.; Goeke, George L.; Jorgensen, Robert J.; and Friis, Nils, 4,684,703, Cl. 526-88.000.

Goff, Ralph D.: *See—*
Aldridge, Robert E.; Elloway, Russell; Fritz, William O.; Goff, Ralph D.; and Herrera, Michael J., 4,684,863, Cl. 318-599.000.

Gohr, Robert A., to Kempsmith Machine Company. Slitter tape applicator. 4,684,433, Cl. 156-517.000.

Golden Key-Futura, Inc.: *See—*
Troncoso, Vincent F., 4,683,865, Cl. 124-24.00R.

Goldman, Maurice: *See—*
Briguet, Andre ; and Goldman, Maurice, 4,684,890, Cl. 324-309.000.

Goldmann, Horst; Mayr, Ernst; and Oestreich, Ulrich, to Siemens Aktiengesellschaft. Cable with a friction reducing outside layer. 4,684,214, Cl. 350-96.230.

Goldring, Stanley D., to Oximetrix, Inc. Electro-optical coupler for catheter oximeter. 4,684,245, Cl. 356-41.000.

Goldwater, John M. Valvular sail power plant. 4,684,817, Cl. 290-55.000.

Gono, Takeshi: *See—*
Osanai, Akinori; Niwa, Takao; and Gono, Takeshi, 4,683,779, Cl. 74-861.000.

Goodbary, Edgar R.; and Bartley, Francis A. Off-highway vehicle body support structure. 4,684,152, Cl. 280-785.000.

Goodman, Alvin M.; Goodman, Lawrence A.; Russell, John P.; and Robinson, Paul H., to RCA Corporation. Method for increasing the switching speed of a semiconductor device by neutron irradiation. 4,684,413, Cl. 437-17.000.

Goodman, Lawrence A.: *See—*
Goodman, Alvin M.; Goodman, Lawrence A.; Russell, John P.; and Robinson, Paul H., 4,684,413, Cl. 437-17.000.

Goodridge, Raymond A. L., to Stothert & Pitt PLC. Pumps. 4,684,335, Cl. 418-189.000.

Goodyear Aerospace Corporation: *See—*
Elam, Paul A.; and Keller, Jack W., 4,683,930, Cl. 152-410.000.

Goodyear Tire & Rubber Company, The: *See—*
Roedseth, John K., 4,684,422, Cl. 156-126.000.
Steidl, Larry E.; and Stemm, Christopher D., 4,684,338, Cl. 425-33.000.

Goransson, Bo: *See—*
Sahlgren, Anders; Gustafsson, Rolf; Goransson, Bo; and Sundqvist, Yngve, 4,684,268, Cl. 384-574.000.

Gordon, Arnold Z., to Gould Inc. Electrochemical power generation with thermal electrolyte management. 4,684,584, Cl. 429-51.000.

Gordon, Walter H.: *See—*
Ryckman, William D.; and Gordon, Walter H., 4,684,788, Cl. 219-413.000.

Gore, John G., to Sawtek, Inc. Environmental control apparatus for electrical circuit elements. 4,684,783, Cl. 219-210.000.

Goring, Cleve A. I.: *See—*
Rogers, Richard B.; and Goring, Cleve A. I., 4,684,394, Cl. 71-90.000.

Gortsema, Frank P.; and Lok, Brent M. T., to Union Carbide Corporation. Process for the halogen modification of aluminophosphate molecular sieves and a product so produced. 4,684,511, Cl. 423-305.000.

Goto, Yasuyuki: *See—*
Kitano, Kisei; Ogawa, Tetsuya; Furukawa, Yoshito; Yoshida, Naoyuki; Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; and Nigorikawa, Kazunori, 4,684,476, Cl. 252-299.610.
Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Ogawa, Tetsuya; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,684,478, Cl. 252-299.630.

Gotz, Kurt: *See—*
Beger, Udo, 4,683,600, Cl. 5-99.00C.

Goudie, Kathleen M.: *See—*
Lin, Kun-Shan; Goudie, Kathleen M.; and Frantz, Gene A., 4,685,135, Cl. 381-52.000.

Goudy, Paul R., Jr., to Autotrol Corporation. Particulates generation and removai. 4,684,063, Cl. 239-2.100.

Goudy, Paul R., Jr., to Autotrol Corporation. Fluid mixer/charger. 4,684,254, Cl. 366-340.000.

Gould Inc.: *See—*
Gordon, Arnold Z., 4,684,584, Cl. 429-51.000.
Knapp, Edward J., Jr., 4,684,915, Cl. 337-276.000.
Kodama, Roy K.; and Koneval, Donald J., 4,683,894, Cl. 128-675.000.

Goulet, Carl R., to Teledyne Industries, Inc. Electronic and mechanical fuel supply system. 4,683,854, Cl. 123-478.000.

Grabbe, Dimitry G.; and Korsunsky, Iosif, to AMP Incorporated. Chip carrier and carrier socket for closely spaced contacts. 4,684,184, Cl. 439-64.000.

Graco Inc.: *See—*
Kwok, Kui-Chiu, 4,684,064, Cl. 239-223.000.

Graef, John: *See—*
Richards, John O.; and Graef, John, 4,683,610, Cl. 16-115.000.

Graetzel, Michael; Serpone, Nick; and Duonghong, Dung, to R. E. Stiftung. Process for the sensitization of an oxidation/reduction photocatalyst, and photocatalyst thus obtained. 4,684,537, Cl. 427-53.100.

Grain Processing Corporation: *See—*
Morehouse, Alpha L.; and Krone, Pamela A., 4,684,410, Cl. 127-40.000.

Gramlich, Walter; Halbritter, Klaus; and Heilen, Gerd, to BASF Aktiengesellschaft. Preparation of alpha-substituted β-dicarbonyl, β-cyano-carbonyl and β-dicyano compounds. 4,684,743, Cl. 558-374.000.

Grammer Sitzsysteme GmbH: *See—*
Grassl, Johann, 4,684,100, Cl. 248-550.000.

Granata, Samuel J., Jr.; and Woodle, Boyd M., to United States of America, Energy. Fuel cell plates with skewed process channels for uniform distribution of stack compression load. 4,684,582, Cl. 429-39.000.

Grandclement, Gerard, to Societe Anonyme Nomegasgne Toutlectric. Process for the control of the welding time of an electrical welded union. 4,684,417, Cl. 156-64.000.

Grapha-Holding AG: *See—*
Boss, Heinz; and Weber, Walter, 4,684,118, Cl. 270-58.000.
Linder, Heinz, 4,683,708, Cl. 53-540.000.

Grass, Alfred. Furniture hinge with a lateral and depth adjustment fitting. 4,683,612, Cl. 16-240.000.

Grass Valley Group, Inc., The: *See—*
Dayton, Birney D.; and Bannister, Richard, 4,684,823, Cl. 307-247.00R.

Grasser, Hans: *See—*
Arnold, Werner; Grasser, Hans; Kruger, Tilmann; and Meisner, Alfred, 4,684,261, Cl. 368-107.000.

Grassl, Johann, to Grammer Sitzsysteme GmbH. Sprung vehicle seat. 4,684,100, Cl. 248-550.000.

Graumann, Rainer, to Siemens Aktiengesellschaft. Nuclear magnetic resonance apparatus. 4,684,892, Cl. 324-309.000.

Gravelle, Alain, to FRAGEMA. Method and device for detecting defective nuclear fuel elements. 4,684,493, Cl. 376-252.000.

Gray, Douglas S.: *See—*
Butler, Ronald G.; Lehman, John R.; Gray, Douglas S.; and Houck, Wayne R., 4,683,906, Cl. 137-375.000.

Gray, Leslie F.: *See—*
Chenot, Charles F.; Gray, Leslie F.; and Krebs, Michael A., 4,684,539, Cl. 427-64.000.

Gray, Rita Ann: *See—*
Dill, James M., 4,684,933, Cl. 340-572.000.

Greco, Alberto; Busetto, Carlo; Cassar, Luigi; and Neri, Carlo, to Enichem Sintesi, S.p.A. Reactive stabilizing compounds containing a sterically hindered amino group and a hydrolyzable silyl function. 4,684,726, Cl. 544-69.000.

Greco, Joseph A., II; Hawkins, Donald K.; LeGrys, Scott R.; and Kit Man, Wai. Generic database generator system and method. 4,685,068, Cl. 364-518.000.

Green Cross Corporation, The: *See—*
Imagawa, Takashi; Yokoyama, Kazumasa; and Mizushima, Yutaka, 4,684,633, Cl. 514-78.000.

Green, Donald E., to Oral-D (L.P.). Orally effective ion chelators. 4,684,482, Cl. 260-404.500.

Greengrass, Colin W.; Hoople, David W. T.; and Howarth, Thomas T., to Pfizer Inc. 7-hydroxyaminocephalosporin antibiotics. 4,684,641, Cl. 514-201.000.

Greengrass, Colin W.; Hoople, David W. T.; and Howarth, Thomas T., to Pfizer Inc. 7-Hydroxyaminocephalosporin antibiotics. 4,684,642, Cl. 514-201.000.

Greenhalgh, Milton, to General Electric Company. Smoke and/or heat detection apparatus containing thermal-sensitive insulating composition. 4,684,790, Cl. 219-505.000.

Greer, Thomas J., Jr. Motor element for facially animated mannequin. 4,683,669, Cl. 40-414.000.

Gregg, Arthur H. Roofing tiles. 4,683,697, Cl. 52-520.000.

Grenness, Morten: *See—*
Yeh, Lun-Shu R.; Grenness, Morten; and Fuller, Robert J., 4,683,648, Cl. 29-623.500.

Grieves, Randolph C.: *See—*
Nelson, Roy A.; Entriken, Raymond A.; and Grieves, Randolph C., 4,684,072, Cl. 241-172.000.

Griffin, David A.: *See—*
Clough, John M.; and Griffin, David A., 4,684,396, Cl. 07-92.000.

Grois, Igor: *See—*
Margolin, Mark; Moore, James E.; and Grois, Igor, 4,684,205, Cl. 350-96.210.

Grotto, La Von P. Grain cleaning auger. 4,684,458, Cl. 209-31.000.

Gruppo Lepetit S.p.A.: *See—*
Malabarba, Adriano; and Cavalleri, Bruno, 4,684,644, Cl. 514-210.000.

GTE Communication Systems Corporation: *See—*
Black, James B., 4,685,103, Cl. 370-58.000.
Burns, Robert V., 4,685,130, Cl. 379-413.000.
Ravindhran, Kothandaraman S.; and Kulkarni, Narayan M., 4,683,641, Cl. 437-41.000.
Soderlund, Ernest E., 4,684,884, Cl. 324-73.00R.

GTE Government Systems Corporation: *See—*
Batson, David C.; and Goebel, Franz, 4,684,587, Cl. 429-115.000.
Goebel, Franz; and Batson, David C., 4,684,588, Cl. 429-115.000.
Haskins, Timothy B.; Goebel, Franz; Batson, David C.; and Zuffante, Charles R., 4,684,586, Cl. 429-115.000.

GTE Laboratories Incorporated: *See—*
Klinedinst, Keith A.; and Gary, Richard A., 4,684,583, Cl. 429-48.000.
Seymour, Robert J.; Liu, Jia-ming; and Chen, Ying C., 4,685,108, Cl. 372-19.000.
Thakur, Mrinal K.; Tripathy, Sukant K.; and Sandman, Daniel J., 4,684,434, Cl. 156-622.000.

GTE Products Corporation: *See—*
Chenot, Charles F.; Gray, Leslie F.; and Krebs, Michael A., 4,684,539, Cl. 427-64.000.
Faria, Sixdeniel; and Karam, Ronald E., 4,684,595, Cl. 430-94.000.
Ladd, Judith A.; and Vanderpool, Clarence D., 4,684,401, Cl. 75-0.5BA.
Mizuhara, Howard, 4,684,579, Cl. 428-606.000.
Ritsko, Joseph E.; Port, David J.; and Houck, David L., 4,684,400, Cl. 75-0.5AB.
Schulze, Harry O., 4,684,540, Cl. 427-71.000.

Guelck, Volker, to Illinois Tool Works Inc. Shoe for a closure. 4,683,675, Cl. 49-181.000.

Gunter O. Stumpf GmbH & Co. KG: *See—*
Stumpf, Gunter O., 4,683,658, Cl. 30-275.000.

Gunther, Albert W., Jr.: *See—*
Brewer, Jimmy D.; Gunther, Albert W., Jr.; and Gunther, Albert W., Sr., 4,684,306, Cl. 414-22.000.

Gunther, Albert W., Sr.: *See—*
Brewer, Jimmy D.; Gunther, Albert W., Jr.; and Gunther, Albert W., Sr., 4,684,306, Cl. 414-22.000.

Guntly, Thomas G., to Tecumseh Products Company. Primer system and method for priming an internal combustion engine. 4,684,484, Cl. 261-35.000.

Gurzynski, Richard M., to Nieman Design Systems Inc. Display rack assembly. 4,684,030, Cl. 211-88.000.

Gussman, Robert L., to Reliability Incorporated. Burn-in board for use with automated unloader. 4,684,182, Cl. 439-68.000.

Gustafsson, Jan-Erik: *See—*
Andersson, Susanne; Gustafsson, Jan-Erik; Herngren, Torbjorn; and Carlsson, Staffan, 4,683,841, Cl. 122-22.000.

Gustafsson, Rolf: *See—*
Sahlgren, Anders; Gustafsson, Rolf; Goransson, Bo; and Sundqvist, Yngve, 4,684,268, Cl. 384-574.000.

Gutierrez, Antonio: *See—*
Bock, Jan; Brownawell, Darrell W.; Gutierrez, Antonio; Robbins, Max L.; Shaub, Harold; and Steyn, Peter L., 4,684,473, Cl. 252-49.800.

Gutierrez, Richard: *See—*
Kay, Edward L.; and Gutierrez, Richard, 4,684,715, Cl. 528-493.000.

Guzowski, Steven J.: *See—*
Kar, Nareshchandra J.; Salesky, William J.; and Guzowski, Steven J., 4,683,781, Cl. 76-108.00A.

Gyro-Flex Corporation: *See—*
Escher, James C., 4,684,124, Cl. 272-128.000.

H. Lundbeck A/S: *See—*
Bogeso, Klaus P., 4,684,650, Cl. 514-252.000.

H. Putsch GmbH & Comp.: *See—*
Bittner, Hans-Joachim, 4,683,790, Cl. 83-356.300.

Ha, Jung Yong, to Kia Motors Corp. Automatic control circuit for brake control devices. 4,684,177, Cl. 303-100.000.

Haaf, William R.: *See—*
Bates, Gary M.; Haaf, William R.; and Ting, Sai-Pei, 4,684,696, Cl. 525-68.000.

Haag, Ronald H.; and Schlaps, Edgar H., to General Motors Corporation. Vehicle daytime running lamps. 4,684,819, Cl. 307-10.00R.

Haas, Carroll J., II. Ball valve. 4,684,105, Cl. 251-150.000.

Haas Pharmaceuticals, Inc.: *See—*
Haas, Robert T., 4,684,666, Cl. 514-557.000.

Haas, Robert T., to Haas Pharmaceuticals, Inc. Stabilized liquid analgesic compositions. 4,684,666, Cl. 514-557.000.

Haddad, Hussain A.: *See—*
Munson, Robert E.; Haddad, Hussain A.; and Hanlen, John W., 4,684,952, Cl. 343-700.0MS.

Hafele, Joseph C.; and Crayton, John W., to Caterpillar Inc. Contamination monitor and method. 4,685,066, Cl. 364-509.000.

Hagedoorn, Arend L.: *See—*
Vitringa, Frederick A.; and Hagedoorn, Arend L., 4,685,094, Cl. 367-183.000.

Hagemeister, Robert C., to Webster Spring Co. Inc. Bent wire spring module. 4,684,111, Cl. 267-103.000.

Hager & Elsasser GmbH: *See—*
Marquardt, Kurt, 4,684,464, Cl. 210-189.000.

Hager, Jorg: *See—*
Schulz, Volker; Leyck, Sigurd; Durr, Manfred; Ghyczy, Miklos; Wendel, Armin; and Hager, Jorg, 4,684,632, Cl. 514-78.000.

Hahn, Reinhard; and Andorfer, Hermann, to GFE Gesellschaft fur Elektrometallurgie mbH. Master alloy for the production of titanium-based alloys and method for producing the master alloy. 4,684,506, Cl. 420-552.000.

Hailey, Michael L., to Transportation Specialties, Inc. Locking device. 4,683,728, Cl. 70-14.000.

Hakenewerth, Paul A.; Wadia, Aspi B.; Walker, James R.; and White, James M., to International Business Machines Corporation. Elliptical finger press scanner with rotating light source. 4,684,802, Cl. 250-235.000.

Halbritter, Klaus: *See—*
Gramlich, Walter; Halbritter, Klaus; and Heilen, Gerd, 4,684,743, Cl. 558-374.000.

Halder, Mathis: *See—*
Antes, Gregor; Halder, Mathis; Fuchs, Paul; and Gehr, Peter, 4,685,138, Cl. 382-12.000.

Hale, Steven D.: *See—*
May, Joe T.; and Hale, Steven D., 4,685,074, Cl. 364-564.000.

Hall, Edward A., to McDonnell Douglas Corporation. Reduced height monopole/crossed slot antenna. 4,684,953, Cl. 343-725.000.

Hall, James W. Timing device. 4,683,747, Cl. 73-119.00R.

Hall, Scott D.: *See—*
Bierkamp, James A.; Hall, Scott D.; and Smith, Wade W., 4,683,942, Cl. 165-53.000.

Halliburton Company: *See—*
Stepp, Lee W.; Baldridge, Morris G.; and Treece, Harold O., 4,683,955, Cl. 166-327.000.
Walker, Michael L.; Ford, William G. F.; Dill, Walter R.; and Gdanski, Ricky D., 4,683,954, Cl. 166-307.000.
Zimmer, Mark D., 4,684,947, Cl. 340-858.000.

Halme, Aarne: *See—*
Manninen, Markku; and Halme, Aarne, 4,685,054, Cl. 364-191.000.

Halstead, Larry D.: *See—*
Copland, Donald S.; Halstead, Larry D.; and O'Brien, Lawrence E., 4,684,025, Cl. 206-484.000.

Hamill, Paul E., Jr.; and Vance, Macy W., to United States Steel Corporation. Ingot mold and method of producing same. 4,683,937, Cl. 164-125.000.

Hammill, Harry B., III, to Calspan Corporation. Target member for use in a positioning system. 4,684,247, Cl. 356-152.000.

Hanaoka, Hiroshi; and Matsumiya, Sadayuki, to Mitutoyo Mfg. Measuring instrument. 4,684,257, Cl. 356-374.000.

Hanatani, Sakio; and Yakushiji, Tuguharu, to Sharp Kabushiki Kaisha. Weight measuring device. 4,683,967, Cl. 177-144.000.

Hanazono, Masanobu; Hara, Shinichi; Akiyama, Hirosi; Hayashi, Masaaki; Saitoo, Harunobu; and Kurisu, Takumi, to Computer Basic Technology Association. Production method of thin film magnetic head. 4,685,014, Cl. 360-126.000.

Handa, Masahisa: *See—*
Okamoto, Tadashi; Matsubara, Sumiyuki; and Handa, Masahisa, 4,684,567, Cl. 428-257.000.

Handa, Takayuki; Takeuchi, Yasushi; Kato, Masumi; and Seki, Hisazi, to Mitsui Petrochemical Industries. Apparatus for fusibly interconnecting thermoplastic pipes. 4,684,430, Cl. 156-366.000.

Handy & Harman: *See—*
McDonald, Allen S.; Philp, Charles W.; and Sperakis, Thomas A., 4,684,052, Cl. 228-122.000.

Hanlen, John W.: *See—*
Munson, Robert E.; Haddad, Hussain A.; and Hanlen, John W., 4,684,952, Cl. 343-700.0MS.

Hansch, Egon, to Ferag AG. Method and apparatus for collating folded printed signatures using conveyors rotating about a central axis. 4,684,116, Cl. 270-54.000.

Hansch, Egon: *See—*
Honegger, Werner; and Hansch, Egon, 4,684,117, Cl. 270-54.000.

Hansel, James G.: *See—*
Fernbacher, John M.; and Hansel, James G., 4,683,947, Cl. 166-251.000.

Hansen, Harmon R.; and Lingenfelter, Thomas A., to U.S.D. Corp. Breathing regulator mouthpiece. 4,683,881, Cl. 128-204.260.

Hansen, Robert D.: *See—*
Klimpel, Richard R.; and Hansen, Robert D., 4,684,459, Cl. 209-166.000.

Hara, Shinichi: *See—*
Hanazono, Masanobu; Hara, Shinichi; Akiyama, Hirosi; Hayashi, Masaaki; Saitoo, Harunobu; and Kurisu, Takumi, 4,685,014, Cl. 360-126.000.

Harada, Akira: *See—*
Tange, Kohsuke; Takahashi, Osamu; Furuya, Yuhki; and Harada, Akira, 4,683,644, Cl. 437-7.000.

Harada, Naoki: *See—*
Miyamoto, Tetsuya; Omura, Takashi; Harada, Naoki; and Takeshita, Akira, 4,684,721, Cl. 540-126.000.

Harada, Saburo, to Koto Electric Co., Ltd. Hermetically sealable package for electronic component. 4,684,763, Cl. 174-52.0FP.

Harano, Tetsuo: *See—*
Sakakibara, Kenji; Harano, Tetsuo; Bandai, Yasuhito; and Ohta, Eiichi, 4,684,999, Cl. 358-294.000.

Harcuba, Siegfried. Method and apparatus for the thermal treatment of a batch of raw material. 4,684,342, Cl. 432-103.000.

Harder, John W., to Eastman Kodak Company. Oxidative release of photographically useful groups from hydrazide compounds. 4,684,604, Cl. 430-375.000.

Harkins, Carl G., to Hewlett-Packard Company. Method and apparatus for prevention of atmospheric corrosion of electronic equipment. 4,684,510, Cl. 423-210.000.

Harper, Chester H., to Allen Fruit Co., Inc. Apparatus and method for installing lids on containers. 4,683,706, Cl. 53-485.000.

Harrington, Peter J.: *See—*
Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J.; and Fletcher, Stephen R., 4,684,653, Cl. 514-258.000.

Harris, Charles M. Clip for use with gasoline pump dispensing handle. 4,683,923, Cl. 141-392.000.

Harris Corporation: *See—*
Adams, William C., Jr.; and Patisaul, Charles R., 4,684,955, Cl. 342-351.000.
Baer, Scott D.; and Glenn, Thomas P., 4,684,055, Cl. 228-180.100.

Harrison, David M.; Gentili, Robert P.; and Bellucci, George N., to Allied Corporation. Particle deflector and method of distributing dissimilar particles. 4,683,922, Cl. 141-9.000.

Harrison, John R.: *See—*
Sardella, Louis M.; West, John B.; Harrison, John R.; and Parr, Dennis J., 4,683,822, Cl. 101-382.0MV.

Harrison, Michael R.: *See—*
White, Donald R.; and Harrison, Michael R., 4,685,099, Cl. 370-30.000.

Hart, Edward E., to Spectra-Physics, Inc. Magnetic speed reduction device. 4,684,836, Cl. 310-83.000.

Hartel, Volker: *See—*
Ghibu, Michael; Hartel, Volker; Heynemann, Carl; and Raubach, Manfred, 4,683,979, Cl. 181-286.000.

Hartkemeyer, Robert. Mat for absorbing oil and other liquids. 4,684,562, Cl. 428-182.000.

Hartley, E. Dale; and Hartley, F. Scott, to Product Research and Development. Ratio pump and method. 4,684,332, Cl. 417-397.000.

Hartley, F. Scott: *See—*
Hartley, E. Dale; and Hartley, F. Scott, 4,684,332, Cl. 417-397.000.

Hartman, Robert L.: *See—*
Ackerman, David A.; Camarda, Renato M.; Hartman, Robert L.; and Spector, Magaly, 4,684,883, Cl. 324-71.500.

Hartman, William J., Sr., to Delong, Robert W., a part interest. Electromagnetic motor. 4,684,834, Cl. 310-24.000.

Hartmann, Claus: *See—*
Pietsch, Gunther; and Hartmann, Claus, 4,684,574, Cl. 428-402.200.

Hartwell Corporation: *See—*
Anderson, John P., 4,683,614, Cl. 16-362.000.

Haruna, Kazuo; Ueda, Kanji; and Uno, Masaru, to Seitetsu Kagaku Co., Ltd. Process for producing oxygen-enriched gas. 4,684,377, Cl. 55-26.000.

Harvey, Brian J.: *See—*
Denny, Christopher G.; and Harvey, Brian J., 4,684,366, Cl. 604-130.000.

Harwood, Leopold A.: *See—*
Roeder, Barbara J.; Harwood, Leopold A.; and Weckenbrock, Hermann J., 4,684,989, Cl. 358-167.000.

Haselbauer, Peter: *See*—
Fey, Edmond O.; Haselbauer, Peter; Jung, Dae Y.; Kaschak, Ronald A.; Kilthau, Hans-Dieter; Magnuson, Roy H.; and Wagner, Robert J., 4,684,545, Cl. 427-98.000.

Hashimoto, Isao; Kinoshita, Tosuke; Uchida, Masahiro; and Uchiyama, Susumu, to Kawasaki Jukogyo Kabushiki Kaisha. Classifier and controller for vertical mill. 4,684,069, Cl. 241-79.100.

Hashimoto, Kazuaki, to Nikkiso Co., Ltd. Canned motor pump. 4,684,329, Cl. 417-357.000.

Hashimoto, Shunichi: *See*—
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,684,397, Cl. 71-96.000.

Haskins, Timothy B.; Goebel, Franz; Batson, David C.; and Zaffante, Charles R., to GTE Government Systems Corporation. Electrochemical cell with interlocking anode. 4,684,586, Cl. 429-115.000.

Hata, Hitoshi: *See*—
Tsubouchi, Toshiyuki; and Hata, Hitoshi, 4,684,754, Cl. 585-21.000.

Hata, Kazuyuki: *See*—
Umezawa, Norihiro; and Hata, Kazuyuki, 4,684,407, Cl. 106-90.000.

Hatada, Kenzo: *See*—
Matsunaga, Koji; and Hatada, Kenzo, 4,684,974, Cl. 357-68.000.

Hatakeyama, Sakichi; and Takahashi, Hiroshi, to Honda Giken Kogyo Kabushiki Kaisha. Transmission for self-propelled working vehicles. 4,683,766, Cl. 74-333.000.

Hatcher, Herbert J.: *See*—
Pedersen, Daniel E.; and Hatcher, Herbert J., 4,684,469, Cl. 210-632.000.

Hatfield, Gregory A.; and Lash, Robert E., to MD Engineering. Noise attenuating smokeless surgical device. 4,683,884, Cl. 128-303.140.

Hatfield, Jerry L. Printed circuit repair process. 4,683,652, Cl. 29-829.000.

Hattori, Kiyoshi; and Usuda, Eiji, to Fanuc Ltd. Programmable controller with fault detection. 4,685,053, Cl. 364-184.000.

Hattori, Shigeo: *See*—
Asari, Akira; Yamamura, Takashige; Hattori, Shigeo; and Ueno, Tsuneya, 4,683,630, Cl. 29-159.010.

Hattori, Toshihiro; Uchiyama, Nobuichi; Asagi, Yasuyoshi; Ogawa, Noriaki; and Kasai, Hitoshi, to Isuzu Motors Limited; and Fujitsu Limited. Method of controlling automatic transmission. 4,683,996, Cl. 192-0.033.

Hattori, Toshihiro; Shishido, Katsuya; Kasai, Hitoshi; Moride, Shigeki; and Ogawa, Noriaki, to Isuzu Motors Limited; and Fujitsu Limited. Revolution signal processing system for vehicular electronic controller. 4,685,051, Cl. 364-424.100.

Hattori, Yoshifumi: *See*—
Hirosawa, Toshiaki; Akiyama, Yoshie; Ebisawa, Isao; Hattori, Yoshifumi; and Abe, Tsutomu, 4,684,962, Cl. 346-140.00R.

Hawelka, Walter; and Staudinger, Hermann, to Konrad Rosenbauer KG. Service vehicle. 4,683,976, Cl. 180-311.000.

Hawkins, Donald K.: *See*—
Greco, Joseph A., II; Hawkins, Donald K.; LeGrys, Scott R.; and Kit Man, Wai, 4,685,068, Cl. 364-518.000.

Hawrylko, Roman B., to B. F. Goodrich Company, The. Process for producing porous spherical polyvinyl chloride particles. 4,684,668, Cl. 521-56.000.

Hayakawa, Shuzo: *See*—
Taniguchi, Masao; Morita, Yoshiharu; Hayakawa, Shuzo; and Kawashima, Osamu, 4,684,732, Cl. 546-144.000.

Hayashi, Atsushi: *See*—
Horino, Hiroshi; Ohnaka, Michiro; Hayashi, Atsushi; and Ikeno, Yoshiko, 4,684,737, Cl. 549-240.000.

Hayashi, Masaaki: *See*—
Hanazono, Masanobu; Hara, Shinichi; Akiyama, Hirosi; Hayashi, Masaaki; Saitoo, Harunobu; and Kurisu, Takumi, 4,685,014, Cl. 360-126.000.

Hayashi, Seiichi; Takei, Katsumori; and Yamaguchi, Yoshitaka, to Seiko Epson Kabushiki Kaisha. Electrothermal transfer recording sheet. 4,684,563, Cl. 428-207.000.

Hayashi, Torahiko; and Ota, Etsuo, to Rheon Automatic Machinery Co., Ltd. Apparatus and method for arraying and conveying rows of products. 4,684,008, Cl. 198-436.000.

Hayes, Michael E.; Hrebenar, Kevin R.; Murphy, Patricia L.; Futch, Laurence E., Jr.; Deal, James F., III; and Bolden, Paul L., Jr., to Petroleum Fermentations N.V. Combustion of viscous hydrocarbons. 4,684,372, Cl. 44-51.000.

Hayman, Eric R.; and Penniman, Scott R., to Shaw/Walker Compa. . Clipboard for one-write check writing and recording systems. 4,684,154, Cl. 282-29.00R.

Head, David F.: *See*—
Kafka, James D.; Baer, Thomas M.; and Head, David F., 4,685,107, Cl. 372-6.000.

Hean, George J., Sr. Theft resistant cabinet for coin operated equipment. 4,684,035, Cl. 220-346.000.

Heard, Nigel A., to Shell Oil Company. Method and apparatus for uniform microwave bulk heating of thick viscous materials in a cavity. 4,684,776, Cl. 219-10.55M.

Heaston, Bruce A., to General Motors Corporation. Power latch circuit for computer self deactivation. 4,685,023, Cl. 361-88.000.

Hedstrand, David M.: *See*—
Dunbar, Joseph E.; and Hedstrand, David M., 4,684,398, Cl. 71-98.000.

Hegedus, Denes A.: *See*—
Carlson, Lee R.; Hegedus, Denes A.; Jarrett, Steven M.; Miller, Michael F.; Riley, Martin E.; and Wright, David L., 4,685,109, Cl. 372-61.000.

Heilen, Gerd: *See*—
Gramlich, Walter; Halbritter, Klaus; and Heilen, Gerd, 4,684,743, Cl. 558-374.000.
Rentzea, Costin; Sauter, Hubert; Zeeh, Bernd; Heilen, Gerd; and Jung, Johann, 4,684,392, Cl. 71-76.000.

Heine, Helmut A.: *See*—
Schmidt, Otto H.; Heine, Helmut A.; and Rosenbusch, Helmut, 4,684,227, Cl. 351-205.000.

Heine Optotecnik GmbH & Co. KG: *See*—
Schmidt, Otto H.; Heine, Helmut A.; and Rosenbusch, Helmut, 4,684,227, Cl. 351-205.000.

Heinecke, Rudolf A. H.; Ojha, Suresh M.; and Llewellyn, Ian P., to Standard Telephones & Cables. Surface treatment of plastics material. 4,684,535, Cl. 427-38.000.

Heitz, Steven: *See*—
Ewbank, Michael E.; and Heitz, Steven, 4,683,722, Cl. 60-656.000.

Hek, Dirk G.: *See*—
van der Vegte, Jan; and Hek, Dirk G., 4,684,212, Cl. 350-96.210.

Helena Laboratories: *See*—
Mayes, Ronald A., 4,683,911, Cl. 137-561.00A.

Helena Laboratories Corporation: *See*—
Butts, Gene A.; Garsee, Henry A.; Kelley, Charles D.; Petty, Bruce R.; and Pauley, James L., 4,684,244, Cl. 356-39.000.

Heller, Rudolf, to Contraves AG. Support apparatus for an optical observation device. 4,684,088, Cl. 248-123.100.

Hemex Scientific, Inc.: *See*—
Martin, Richard L., 4,683,883, Cl. 128-303.00R.

Hempelmann, Heinrich J., to NI Industries, Inc. Simulated wire wheel trim. 4,683,629, Cl. 29-159.00A.

Hemphill, John K.; and Eikenberry, Eric J., to Sungene Technologies Corporation. Process for regenerating soybeans. 4,684,612, Cl. 435-240.500.

Henderson, James A.; Travlos, Constantine M.; Ferris, David S.; Duddy, Gerald J.; and Mercier, Roland F., to Westinghouse Electric Corp. Wire preparation system. 4,683,636, Cl. 29-564.600.

Henkel Kommanditgesellschaft auf Aktien: *See*—
Konrad, Gunther; Maak, Norbert; and Lieske, Edgar, 4,684,371, Cl. 8-408.000.
Moeller, Hinrich; and Wallat, Siegfried, 4,684,665, Cl. 514-543.000.

Henneberry, James W. Engine oil level indicator. 4,683,851, Cl. 123-196.00S.

Henning, Rainer; and Urbach, Hansjorg, to Hoechst Aktiengesellschaft. Disubstituted proline derivatives. 4,684,662, Cl. 548-452.000.

Hepp, Leonard R., to General Electric Company. Glass fiber reinforced polyester molding compositions containing metal powders. 4,684,686, Cl. 524-281.000.

Herbst, Ewa; and Botvidsson, Lars I., to Herbst, Ewa. Method for fixing an electrical electrode to bone tissue. 4,683,896, Cl. 128-785.000.

Hercules Incorporated: *See*—
Craig, Daniel H., 4,684,704, Cl. 526-200.000.

Hergeth Hollingsworth GmbH: *See*—
Baltzer, Erich, 4,683,625, Cl. 28-191.000.

Hermann, Wilhelm G.: *See*—
Clasen, Rolf; and Hermann, Wilhelm G., 4,684,387, Cl. 65-18.400.

Herngren, Torbjorn: *See*—
Andersson, Susanne; Gustafsson, Jan-Erik; Herngren, Torbjorn; and Carlsson, Staffan, 4,683,841, Cl. 122-22.000.

Herrera, Michael J.: *See*—
Aldridge, Robert E.; Elloway, Russell; Fritz, William O.; Goff, Ralph D.; and Herrera, Michael J., 4,684,863, Cl. 318-599.000.

Herrington, Fox J., to Mobil Oil Corporation. Movable clamp orienter for draw tape. 4,684,359, Cl. 493-211.000.

Herrity, Kenneth R.: *See*—
Ferguson, Frank W.; and Herrity, Kenneth R., 4,684,349, Cl. 434-308.000.

Herrmann, John L., Jr.: *See*—
Christiansen, Robert G.; Bell, Malcolm R.; Herrmann, John L., Jr.; and Opalka, Chester J., Jr., 4,684,636, Cl. 514-176.000.

Herzog, Albin: *See*—
Maeder, Rene; and Herzog, Albin, 4,683,918, Cl. 140-73.000.

Hetherington, Michael W. Electrical outlet assembly. 4,684,186, Cl. 439-171.000.

Hewitt, Steven W.: *See*—
Simkins, Philip P., 4,684,016, Cl. 206-45.130.

Hewlett, Clarence W., Jr., to Genicom Corporation. Print element control. 4,683,818, Cl. 101-93.040.

Hewlett-Packard Company: *See*—
Harkins, Carl G., 4,684,510, Cl. 423-210.000.
Huffman, John W.; Picht, Brian J.; and Tyson, Ben B., 4,684,273, Cl. 400-247.000.

Hewson, Carl E., to Brunswick Manufacturing Co., Inc. Method and apparatus for controlled breathing employing internal and external electrodes. 4,683,890, Cl. 128-419.0PG.

Hexamer, Donald K.: *See*—
Ebrahim, Sajjad; and Hexamer, Donald K., 4,684,024, Cl. 206-464.000.

Heynemann, Carl: *See*—
Ghibu, Michael; Hartel, Volker; Heynemann, Carl; and Raubach, Manfred, 4,683,979, Cl. 181-286.000.

Heyraud, Marc A.; and Kureth, Jean-Bernard, to Asgalium S.A. Electric motor drive equipped with a permanently magnetized rotor. 4,684,860, Cl. 318-696.000.

Hibbel, Joseph: *See*—
Kessen, Gunther; Cornils, Boy; Gick, Wilhelm; Wiebus, Ernst; Hibbel, Joseph; Bach, Hanswilhelm; and Zgorzelski, Wolfgang, 4,684,750, Cl. 568-883.000.
Hidai, Yutaka: *See*—
Ooi, Katsunori; Hidai, Yutaka; Kurosawa, Yoshiaki; and Nakamura, Yoshikatsu, 4,685,142, Cl. 382-13.000.
Hideshima, Yasuhiro: *See*—
Toyoshima, Masakatsu; Hideshima, Yasuhiro; and Fujita, Etsumi, 4,684,981, Cl. 358-86.000.
Higashio, Yasuhiko; and Takahashi, Kazuteru, to Sumitomo Chemical Company, Ltd. Production of 2,5-dimethyl-2,4-hexadiene. 4,684,758, Cl. 585-608.000.
Higginbotham, Clark A.; and Wichmann, James W., to DeSoto, Inc. Thermosetting fluorocarbon polymer primers. 4,684,677, Cl. 523-435.000.
Higuchi, Takayoshi; Tanahashi, Mitsuhiko; and Mastukura, Motoo, to Jujo Paper Co., Ltd. Production of 2,6-bis (4-hydroxy-3,5-dimethoxyphenyl-3,7-dioxabicyclo (3.3.0) octane. 4,684,740, Cl. 549-464.000.
Hihi, Bachir. Light-source multiplication device. 4,684,919, Cl. 340-84.000.
Hildebrand, David B.: *See*—
Johnson, Charles B.; Box, Jeffrey L.; and Hildebrand, David B., 4,685,104, Cl. 370-67.000.
Hilker, Gregory J.; and Tieman, Edward A., to Dana Corporation. Differential axle speed sensing mechanism. 4,683,775, Cl. 74-710.000.
Hill, Danny B.: *See*—
Broughman, John D., Jr.; Calvert, Barry G.; and Hill, Danny B., 4,683,745, Cl. 73-49.200.
Hill, Gilman A.; Passamaneck, Richard S.; and Touryan, Kenell J., to Mt. Moriah Trust. Well treating system for stimulating recovery of fluids. 4,683,943, Cl. 166-63.000.
Hille, Hans-Dieter: *See*—
Diefenbach, Horst; Dobbelstein, Arnold; and Hille, Hans-Dieter, 4,684,676, Cl. 523-411.000.
Hillinger, Bruno; and Beckmann, Georg, to Waagner-Biro Aktiengesellschaft. Method for the continuous gasification of solid fuel. 4,684,374, Cl. 48-197.00R.
Hills, Robert N.: *See*—
Foster, Donald D.; and Hills, Robert N., 4,684,043, Cl. 222-386.000.
Hilti Aktiengesellschaft: *See*—
Erdt, Wolfgang; Reitberger, Rudolf; and Stocker, Erwin, 4,684,303, Cl. 409-235.000.
Hiltmann nee Ponty, Aranka: *See*—
Welzel, Peter; Kunisch, Franz; Stein, Hermann; Hiltmann nee Ponty, Aranka; and Kruggel, Frithjof, 4,684,626, Cl. 514-25.000.
Himmetsberger, Alois: *See*—
Leichtfried, Friedrich; Wuerthner, Hubert; and Himmetsberger, Alois, 4,684,146, Cl. 280-626.000.
Hinai, Masakatsu: *See*—
Masumoto, Hakaru; Sawaya, Showhachi; and Hinai, Masakatsu, 4,684,414, Cl. 148-11.50R.
Hinman, Edmund R., to Ex-Cell-O Corporation. Electrical continuity clamp for ECM machine. 4,684,455, Cl. 204-212.000.
Hinton, Earle L.: *See*—
Vezirian, Edward; and Hinton, Earle L., 4,684,015, Cl. 206-19.000.
Hirakawa, Norishige; Okada, Kazuo; and Sato, Kazuhiko, to Iwaki Co., Ltd. Self-priming pump. 4,684,333, Cl. 417-420.000.
Hirano, Akira, to NEC Corporation. Motion compensated interframe decoding apparatus. 4,684,984, Cl. 358-136.000.
Hirata, Makizo: *See*—
Fujikawa, Tetsuzo; Hirata, Makizo; and Tamba, Shinichi, 4,683,847, Cl. 123-90.200.
Hirata, Terutaka; Azegami, Tadashi; Kimura, Atsushi; and Katayama, Megumi, to Yokogawa Hokushin Electric Corporation. Capacitive displacement transducer. 4,683,754, Cl. 73-708.000.
Hirosawa, Makoto, to Dainippon Screen Mfg. Co., Ltd. System for allocating images onto photosensitive materials utilizing flags. 4,684,979, Cl. 358-75.000.
Hirosawa, Toshiaki; Akiyama, Yoshie; Ebisawa, Isao; Hattori, Yoshifumi; and Abe, Tsutomu, to Canon Kabushiki Kaisha. Ink tube connecting system in a liquid jet recording apparatus. 4,684,962, Cl. 346-140.00R.
Hirose, Fumiyuki: *See*—
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.
Hisano, Katsukuni: *See*—
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.
Hisatake, Masayuki: *See*—
Inui, Toshiharu; Moriguchi, Haruhiko; Hisatake, Masayuki; and Ohmori, Takashi, 4,685,069, Cl. 364-506.000.
Hitachi Carbide Tools Ltd.: *See*—
Funakawa, Naoyoshi; Demura, Hajime; and Nagamori, Nobuyuki, 4,684,297, Cl. 407-41.000.
Hitachi, Ltd.: *See*—
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.
Kimura, Shin-Ichiro; Murakami, Eiichi; Warabisako, Terunori; Miyake, Kiyoshi; and Sunami, Hideo, 4,683,838, Cl. 118-715.000.
Makiguchi, Kyoko; Sagusa, Hisayuki; and Nomura, Yasushi, 4,684,252, Cl. 356-328.000.
Nakagaki, Nobuhumi; Murata, Toshinori; and Kurita, Toshiyuki, 4,684,985, Cl. 358-140.000.
Nohmi, Makoto; Miyamoto, Shoji; Takaoka, Tadashi; and Oshima, Hiroyasu, 4,684,859, Cl. 318-317.000.
Takahashi, Hiroaki; Kobayashi, Masaharu; Noguchi, Takaharu; Shibuya, Toshifumi; and Arai, Takao, 4,685,004, Cl. 360-32.000.
Tsuzurahara, Mamoru; Baba, Hidetsuyo; and Kitakaze, Seiji, 4,684,845, Cl. 313-341.000.
Yamano, Fumiyuki; and Okajima, Atsushi, 4,685,060, Cl. 364-419.000.
Yoshida, Yaoko, 4,685,076, Cl. 364-736.000.
Hitco: *See*—
Franks, Theodore E., 4,684,304, Cl. 411-171.000.
Hiyama, Naoki: *See*—
Kinoshita, Toshio; and Hiyama, Naoki, 4,684,183, Cl. 439-77.000.
Ho, Vu Q.: *See*—
Naguib, Hussein M.; Calder, Iain D.; Ho, Vu Q.; and Naem, Abdalla A., 4,683,645, Cl. 437-41.000.
Hobart Corporation: *See*—
Fritzsche, Donald E., 4,684,412, Cl. 134-19.000.
Hocken, Lary R.: *See*—
Nehmer, Carl A.; and Hocken, Lary R., 4,684,866, Cl. 318-696.000.
Hodge, James D.; and Lee, Kiu-Seung, to Du Pont de Nemours, E. I., and Company. Solvent system comprising N-alkyl substituted amide and quaternary ammonium compound. 4,684,409, Cl. 106-311.000.
Hoechst Aktiengesellschaft: *See*—
Cooke, Michael D.; and Ross, Barry C., 4,684,640, Cl. 514-195.000.
Gawrisch, Wolfgang, 4,684,487, Cl. 264-22.000.
Henning, Rainer; and Urbach, Hansjorg, 4,684,662, Cl. 548-452.000.
Schiessler, Siegfried; and Spietschka, Ernst, 4,684,753, Cl. 570-206.000.
Schmitt, Klaus; Schoen, Klaus-Peter; Riedel, Peter; Lingnau, Juergen; and Pliefke, Engelbert, 4,684,594, Cl. 430-49.000.
Welzel, Peter; Kunisch, Franz; Stein, Hermann; Hiltmann nee Ponty, Aranka; and Kruggel, Frithjof, 4,684,626, Cl. 514-25.000.
Hoffman, David W.; and Kukla, Cassimer M., to Ford Motor Company. Device for measuring stresses in vacuum deposition coatings. 4,683,758, Cl. 73-780.000.
Hoffman, Donald E.; and McDonald, David B., to General Motors Corporation. Rotary air valve seal arrangement. 4,683,913, Cl. 137-625.400.
Hoffmann-La Roche Inc.: *See*—
Imhof, Rene; and Kyburz, Emilio, 4,684,731, Cl. 546-138.000.
Hohlein, Peter: *See*—
Stahl, Hans G.; Hohlein, Peter; Traenckner, Hans-Joachim; Fleiter, Lothar; and Schwindt, Jurgen, 4,684,691, Cl. 524-534.000.
Holland-Letz, Guenter, to Nixdorf Computer AG. Transport device for card-like recording medium. 4,684,794, Cl. 235-449.000.
Hollingsworth UK Ltd.: *See*—
Whiteley, John, 4,684,074, Cl. 242-18.0DD.
Hollis, Ralph L., Jr.: *See*—
DiStefano, Thomas H.; Hollis, Ralph L., Jr.; Johnson, Mark; and Wang, Sherman S., 4,684,547, Cl. 427-131.000.
Holt, James J. Method for collecting nasal secretions. 4,684,362, Cl. 604-54.000.
Holthusen, Bernd, to Scangraphic Dr. Boger GmbH. Photosetting apparatus. 4,684,228, Cl. 354-4.000.
Holzer, Gerhard: *See*—
Breuer, Kornelia; Gelderie, Udo; Holzer, Gerhard; and Raedisch, Helmer, 4,684,694, Cl. 524-730.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Arai, Takeo; Anno, Nobuo; Kinoshita, Yusuke; and Kusakabe, Yukio, 4,683,844, Cl. 123-41.740.
Hatakeyama, Sakichi; and Takahashi, Hiroshi, 4,683,766, Cl. 74-333.000.
Nakayama, Hitoshi, 4,683,777, Cl. 74-850.000.
Shimamura, Haruo; Kobayashi, Hideo; and Asakura, Masahiko, 4,683,860, Cl. 123-492.000.
Watanabe, Yoshimi; and Yamashita, Kazuya, 4,684,351, Cl. 440-89.000.
Yasuoka, Akimasa, 4,683,857, Cl. 123-478.000.
Hondzinski, Leonard J.; and Wrest, Robert A. Rotatable side blower for air drying vehicles. 4,683,668, Cl. 34-229.000.
Honegger, Werner; and Hansch, Egon, to Ferag AG. Method and apparatus for opening printed products which have been folded off-center. 4,684,117, Cl. 270-54.000.
Honeywell Inc.: *See*—
Adams, John T.; and Mueller, Dale A., 4,684,060, Cl. 236-11.000.
Levine, Michael R., 4,683,939, Cl. 165-12.000.
Wilwerding, Dennis J., 4,684,798, Cl. 250-201.000.
Honeywell Information Systems Inc.: *See*—
Blomstedt, John W.; Yoshida, Paul S.; Irving, Wesley F.; and Roudenko, Vladimir, 4,685,032, Cl. 361-412.000.
Honig, Helmut: *See*—
Paar, Willibald; Pampouchidis, Georg; and Honig, Helmut, 4,684,702, Cl. 525-528.000.
Honjo, Yoshiaki; and Shioya, Masaharu, to Casio Computer Co., Ltd. Omnidirectional vehicle. 4,683,973, Cl. 180-252.000.
Honjo, Yoshiaki, to Casio Computer Co., Ltd. Optical reading and displaying device. 4,685,147, Cl. 382-66.000.
Hono, Susumu; Okuda, Ichiro; Ishihara, Hiroshi; and Hori, Masahiko, to Mitsubishi Cable Industries, Ltd. Driver isolating circuit for common bus-type transmission of local area network. 4,685,113, Cl. 375-7.000.

Hooper, Buddy D. Timing chain retractor and lock. 4,684,357, Cl. 474-101.000.

Hooper, William P.: *See*—
Nichols, E. Lane, III; Hooper, William P.; and Leynse, Kenneth J., 4,685,022, Cl. 361-44.000.

Hoople, David W. T.: *See*—
Greengrass, Colin W.; Hoople, David W. T.; and Howarth, Thomas T., 4,684,641, Cl. 514-201.000.
Greengrass, Colin W.; Hoople, David W. T.; and Howarth, Thomas T., 4,684,642, Cl. 514-201.000.

Hopper, Hans P., to British Petroleum Company p.l.c. Template leveling device. 4,684,291, Cl. 405-190.000.

Hoque, Zahirul; and Oka, Akihiro, to NCR Canada Ltd - NCR Canada Ltee. Method and system for finding image data associated with the monetary amount on financial documents. 4,685,141, Cl. 382-7.000.

Hori, Masahiko: *See*—
Hono, Susumu; Okuda, Ichiro; Ishihara, Hiroshi; and Hori, Masahiko, 4,685,113, Cl. 375-7.000.

Hori, Takako; Myokan, Isao; and Miyabara, Shinji, to Toyama Chemical Co., Ltd. Novel 5-fluoro-2-deoxyuridine derivatives and salts thereof, process for producing the same, and antitumor agents containing the same. 4,684,631, Cl. 514-51.000.

Horiguchi, Akira: *See*—
Shikama, Toshihiro; Ota, Takahisa; Ishizaka, Michihiro; Kira, Hirofumi; Horiguchi, Akira; and Kooi, Yuji, 4,685,105, Cl. 370-86.000.

Horii, Kiyoshi; and Murata, Toshiaki, to Horii, Kiyoshi. Method and apparatus for the generation and utilization of a spiral gas stream in a pipeline. 4,684,296, Cl. 406-153.000.

Horino, Hiroshi; Ohnaka, Michiro; Hayashi, Atsushi; and Ikeno, Yoshiko, to Nippon Zeon Co., Ltd. Process for producing substituted phthalic acid compounds. 4,684,737, Cl. 549-240.000.

Horio, Kenji: *See*—
Otsuka, Akira; Shinoda, Tsutae; Horio, Kenji; and Tanioka, Tsuyoshi, 4,684,849, Cl. 315-169.400.

Horn, Charles; Kelly, Rickey L.; Orendorf, Thomas E.; and Kiger, Terry L., to Vulcan Tool Company. System and apparatus for use in fabricating small tubular articles. 4,684,309, Cl. 414-224.000.

Horne, Donald R., to General Instrument Corp. Program blocking method for use in direct broadcast satellite system. 4,685,131, Cl. 380-20.000.

Hoshino, Kazuya: *See*—
Yamaguchi, Keiki; Hoshino, Kazuya; and Iwaoka, Hideto, 4,684,889, Cl. 324-308.000.

Hosiden Electronics Co., Ltd.: *See*—
Ezure, Tadayoshi; and Sekiguchi, Shigemi, 4,684,199, Cl. 439-610.000.

Hoskins, Michael K., to Ciba Corning Diagnostics Corp. Stabilized isoenzyme control products. 4,684,615, Cl. 436-16.000.

Hosobuchi, Yoshio; Lee, Nancy M.; Loh, Horace H.; and Chang, Jaw-Kang, to Hosobuchi, Yoshio; Lee, Nancy M.; Loh, Horace H.; and Chang, Jaw-Kang. Method of treating cerebral ischemia. 4,684,624, Cl. 514-15.000.

Hosotani, Kenji: *See*—
Fujiwara, Shuetsu; Andoh, Naoki; and Hosotani, Kenji, 4,684,738, Cl. 549-242.000.

Houck, David L.: *See*—
Ritsko, Joseph E.; Port, David J.; and Houck, David L., 4,684,400, Cl. 75-0.5AB.

Houck, Wayne R.: *See*—
Butler, Ronald G.; Lehman, John R.; Gray, Douglas S.; and Houck, Wayne R., 4,683,906, Cl. 137-375.000.

Hough, Stewart E.: *See*—
Carroll, Arthur B.; Hough, Stewart E.; Hunter, Paul R.; Carstedt, John K.; Shaw, Sam R.; and Garrett, James E., 4,684,801, Cl. 250-221.000.

House, Ronnalee; and Kellams, Roger W., to General Motors Corporation. Overmolded electrical connector. 4,684,202, Cl. 439-752.000.

Howarth, Thomas T.: *See*—
Greengrass, Colin W.; Hoople, David W. T.; and Howarth, Thomas T., 4,684,641, Cl. 514-201.000.
Greengrass, Colin W.; Hoople, David W. T.; and Howarth, Thomas T., 4,684,642, Cl. 514-201.000.

Howmet Turbine Components Corporation: *See*—
Brinegar, John R.; and Freeman, William R., 4,684,505, Cl. 420-81.000.

Hrebenar, Kevin R.: *See*—
Hayes, Michael E.; Hrebenar, Kevin R.; Murphy, Patricia L.; Futch, Laurence E., Jr.; Deal, James F., III; and Bolden, Paul L., Jr., 4,684,372, Cl. 44-51.000.

Hruby, Victor J.; and Pelton, John T., to Gibson-Stephens Neuropharmaceuticals, Inc. Cyclic polypeptides having mu-receptor specificity. 4,684,620, Cl. 514-11.000.

Hruda, Robert M.: *See*—
Thurlow, Norman C.; and Hruda, Robert M., 4,683,749, Cl. 73-40.700.

Hsia, Richard Y.; and Liu, Thomas C., to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Communication system having voice and data capability. 4,685,123, Cl. 379-93.000.

Hsu, Su-Ming, to Vector Laboratories, Inc. Method and substance for the enhanced labelling of cellular material. 4,684,609, Cl. 435-7.000.

Huang, Ming C. Foldable lampshade for a hanging lamp. 4,685,038, Cl. 362-352.000.

Huff, George L.: *See*—
Bales, Emmett R.; and Huff, George L., 4,683,866, Cl. 126-25.00B.

Huffman, John W.; Picht, Brian J.; and Tyson, Ben B., to Hewlett-Packard Company. Ribbon shield for impact printer and method for controlling ink flow therein. 4,684,273, Cl. 400-247.000.

Huffman, William F.: *See*—
Ali, Fadia E.; and Huffman, William F., 4,684,622, Cl. 514-11.000.
Callahan, James F.; Huffman, William F.; Moore, Michael L.; and Yim, Nelson C., 4,684,621, Cl. 514-11.000.

Hughes Aircraft Company: *See*—
Cinzori, Robert J., 4,684,248, Cl. 356-152.000.
Morse, Arthur L.; and Thompson, Niels A., 4,684,800, Cl. 250-211.00J.

Hughes, Donald R. Key operated lock. 4,683,739, Cl. 70-363.000.

Huisinga, Richard D.; and Norling, Rayburn E., to Willmar Poultry Company, Inc. Ridge ventilator door. 4,683,811, Cl. 98-42.200.

Huisjen, Martin A.: *See*—
Edwards, Carson P.; Huisjen, Martin A.; and Munson, Robert E., 4,684,929, Cl. 340-541.000.

Hultgren, Claes L., to Dresser Industries, Inc. Lubrication system for a vertical gear unit. 4,683,985, Cl. 184-6.120.

Hunt, Eugene V.; Mosley, Charles G.; and Wheatley, Charles E., III, to Rockwell International Corporation. Controlled oscillator having random variable frequency. 4,684,903, Cl. 331-78.000.

Hunter, Douglas L., to Dow Chemical Company, The. Tertiary amine resins and use thereof. 4,684,667, Cl. 521-32.000.

Hunter, Paul R.: *See*—
Carroll, Arthur B.; Hough, Stewart E.; Hunter, Paul R.; Carstedt, John K.; Shaw, Sam R.; and Garrett, James E., 4,684,801, Cl. 250-221.000.

Huntington Mechanical Laboratories, Inc.: *See*—
Balter, Valentin, 4,683,763, Cl. 74-18.100.

Hutter, Harold G., to Allied Corporation. One-piece crimp-type connector and method for terminating a coaxial cable. 4,684,201, Cl. 439-585.000.

Hutter, Odo; and Jung, Rainer, to Robert Bosch GmbH. Vibrating conveyor with vibration isolation. 4,684,010, Cl. 198-765.000.

Hutter, Romuald J. Safety latch for doors and similar structures. 4,684,159, Cl. 292-268.000.

Hutterer, Frieder; Buess, Gerd; and Boebel, Manfred, to Richard Wolf GmbH. Method for tying sewing threads. 4,683,885, Cl. 128-334.00R.

Hydril Company: *See*—
Breach, William D.; and Vaclavik, Edwin W., 4,684,687, Cl. 524-291.000.

Hydroconic Limited: *See*—
Corlett, Ewan C. B., 4,683,830, Cl. 114-163.000.

Hylton, Thomas A.: *See*—
Tiffany, Burris D.; Nichols, Steve; Meulman, Paul A.; Hylton, Thomas A.; and Lipton, Michael F., 4,684,725, Cl. 540-565.000.

Hyodo, Masakatsu: *See*—
Ohtsuga, Hisao; Morinaga, Akio; Sakaguchi, Yoichi; Hyodo, Masakatsu; and Yagi, Isaburo, 4,684,556, Cl. 428-36.000.

Iannucci, Robert A., to International Business Machines Corporation. High performance memory system utilizing pipelining techniques. 4,685,088, Cl. 365-230.000.

Ibrahim, Ahmed A., to Papyrus Inc. Method for operably adjusting a leading, forming board strip. 4,684,441, Cl. 162-198.000.

Ibuki, Koji: *See*—
Tada, Shoji; and Ibuki, Koji, 4,685,018, Cl. 361-1.000.

Icaro Olivieri & C. S.p.A.: *See*—
Olivieri, Oliviero, 4,684,140, Cl. 280-11.260.

Ichinose, Isao: *See*—
Osugi, Katsuhisa; Ichinose, Isao; Takahashi, Eisaku; and Arahira, Masato, 4,684,664, Cl. 514-475.000.

ICI Australia Limited: *See*—
Parris, David; and Tonner, Steven P., 4,684,755, Cl. 585-257.000.

Idemitsu Kosan Company Limited: *See*—
Tsubouchi, Toshiyuki; and Hata, Hitoshi, 4,684,754, Cl. 585-21.000.

Igel, Richard; and Lutz, Alfons, to Webasto-Werk W. Baier GmbH & Co. Sliding and lifting roof with a locking lever. 4,684,169, Cl. 296-221.000.

Iggulden, Jerry R., to INR Technologies, Inc. Wireless audio transmission system. 4,685,133, Cl. 381-3.000.

Ignatius, James E.: *See*—
Rockar, James A.; and Ignatius, James E., 4,683,693, Cl. 52-198.000.

Igota, Shoji: *See*—
Sasaki, Hitoshi; and Igota, Shoji, 4,684,553, Cl. 428-35.000.

Igusa, Masaru; and Nakai, Masayoshi, to Sanden Corporation. Coffee roaster. 4,683,666, Cl. 34-67.000.

Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, to Hitachi, Ltd. Method of starting gas turbine plant. 4,683,715, Cl. 60-39.060.

Ikari, Kyoichiro: *See*—
Satoh, Kenji; Kaneshige, Isao; and Ikari, Kyoichiro, 4,684,564, Cl. 428-216.000.

Ikari, Masahiro: *See*—
Yamamoto, Fumio; Suzuki, Takayoshi; Ikari, Masahiro; Saito, Susumu; Ohmori, Akira; and Yasuhara, Takashi, 4,684,705, Cl. 526-246.000.

Ikemori, Keiji; and Kato, Masatake, to Canon Kabushiki Kaisha. Zoom lens of the rear focusing type. 4,684,223, Cl. 350-427.000.

Ikeno, Yoshiko: *See*—
Horino, Hiroshi; Ohnaka, Michiro; Hayashi, Atsushi; and Ikeno, Yoshiko, 4,684,737, Cl. 549-240.000.

Ikimi, Yoshihiro: *See*—
Sakata, Masataka; Takasu, Shigeo; and Ikimi, Yoshihiro, 4,683,987, Cl. 187-9.00E.

Illinois Tool Works Inc.: *See*—
Guelck, Volker, 4,683,675, Cl. 49-181.000.
Iltis, Rumult, to Alexander, Ranya L. Moisture sensor. 4,683,904, Cl. 137-78.300.
Imade, Shinichi; and Karaki, Kouichi, to Olympus Optical Co., Ltd. Sample stand adjusting device in an ultrasonic microscope. 4,683,751, Cl. 73-606.000.
Imagawa, Takashi; Yokoyama, Kazumasa; and Mizushima, Yutaka, to Green Cross Corporation, The. Phospholipid-emulsified prostaglandin composition. 4,684,633, Cl. 514-78.000.
Imai, Akihiro; Shimizu, Tokihiko; and Taguchi, Nobuyoshi, to Matsushita Electric Industrial Co., Ltd. Color sheets for thermal transfer printing. 4,684,561, Cl. 428-141.000.
Imhof, Rene; and Kyburz, Emilio, to Hoffmann-La Roche Inc. Phenylquinolizidines. 4,684,731, Cl. 546-138.000.
IMO Delaval Inc.: *See*—
Samek, Norbert E., 4,683,755, Cl. 73-727.000.
Imperial Chemical Industries Plc: *See*—
Clough, John M.; and Griffin, David A., 4,684,396, Cl. 07-92.000.
Inabe, Mitsuo: *See*—
Doi, Yoshiki; Inabe, Mitsuo; and Noro, Osamu, 4,683,723, Cl. 62-6.000.
Inclasco Corporation Ltd.: *See*—
Drolet, Denis; Burchmore, William; and Drolet, Leo , 4,684,130, Cl. 273-67.00A.
Index-Werke Komm.-Ges. Han & Tessky: *See*—
Link, Helmut F., 4,683,787, Cl. 82-18.000.
Ing. C. Olivetti & C., S.p.A.: *See*—
Tronzano, Sergio, 4,685,010, Cl. 360-97.000.
Ingenieurburo Timmer GmbH: *See*—
Timmer, Hans H.; and Reichel, Wolfgang, 4,683,941, Cl. 165-47.000.
Innotech Energy Corporation: *See*—
Curlett, Harry B., 4,683,944, Cl. 166-65.100.
Innovation Industries, Inc.: *See*—
Wright, Mark W., 4,683,990, Cl. 187-134.000.
Inomata, Noriyuki: *See*—
Urakawa, Shigeki; and Inomata, Noriyuki, 4,684,355, Cl. 446-464.000.
Inose, Hiroshi: *See*—
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.
Inou, Kiyoharu; and Saito, Hitoshi, to Yokogawa Hokushin Electric Corporation. DC/DC converter. 4,685,039, Cl. 363-16.000.
Inoue, Hiroshi; Miyazaki, Makoto; Isoi, Masaaki; and Yoda, Makoto, to Toa Nenryo Kogyo Kabushiki Kaisha. Modified elastomer and laminate thereof. 4,684,578, Cl. 428-462.000.
Inoue, Tatsuo, to NEC Corporation. Multilayer wiring substrate. 4,685,033, Cl. 361-414.000.
Inoue, Yoshio; and Aoki, Matsuyuki, to Fuji Xerox Co., Ltd. Toner concentration detecting device for dry type electrographic copy machine. 4,684,236, Cl. 355-3.0DD.
INR Technologies, Inc.: *See*—
Iggulden, Jerry R., 4,685,133, Cl. 381-3.000.
Inside Outfitters, Inc.: *See*—
Dunbar, Donald D., 4,683,933, Cl. 160-273.00R.
Institut Francais du Petrole: *See*—
Lessi, Jacques, 4,683,950, Cl. 166-271.000.
Integrated Logic Systems, Inc.: *See*—
Taylor, David L., Sr.; and Chapman, Hugh N., 4,684,967, Cl. 357-23.110.
Intel Corporation: *See*—
Canepa, George R., 4,685,084, Cl. 365-189.000.
Interface Biomedical Laboratories Corporation: *See*—
Sawyer, Philip N.; and Fitzgerald, Joseph F., 4,684,364, Cl. 604-123.000.
International Business Machines Corporation: *See*—
Bednorz, Johannes G.; Denk, Winfried; Lanz, Martin; and Pohl, Wolfgang D., 4,684,206, Cl. 350-96.120.
Bezama, Raschid J.; and Perry, Charles H., 4,684,339, Cl. 425-389.000.
Brown, Mark W.; and Dubke, Robert E., 4,684,936, Cl. 340-721.000.
Burns, Francis C.; and Carden, Gary R., 4,684,436, Cl. 156-643.000.
Cox, Allen R.; Lowe, Anthony C.; and Wood, John C., 4,684,219, Cl. 350-343.000.
DiStefano, Thomas H.; Hollis, Ralph L., Jr.; Johnson, Mark; and Wang, Sherman S., 4,684,547, Cl. 427-131.000.
Donelon, John J.; Tomkiewicz, Yaffa; Wassick, Thomas A.; and Yeh, James T., 4,684,437, Cl. 156-643.000.
Driscoll, Carleton D.; Najm, Elie M.; and Waechter, Manfred, 4,685,020, Cl. 361-18.000.
Fey, Edmond O.; Haselbauer, Peter; Jung, Dae Y.; Kaschak, Ronald A.; Kilthau, Hans-Dieter; Magnuson, Roy H.; and Wagner, Robert J., 4,684,545, Cl. 427-98.000.
Fields, Davis S., Jr., 4,685,005, Cl. 360-53.000.
Fok, Wilson W.; and Moussouris, John P., 4,684,921, Cl. 340-347.0DD.
Hakenewerth, Paul A.; Wadia, Aspi B.; Walker, James R.; and White, James M., 4,684,802, Cl. 250-235.000.
Iannucci, Robert A., 4,685,088, Cl. 365-230.000.
Jasinski, Joseph M.; Meyerson, Bernard S.; and Scott, Bruce A., 4,684,542, Cl. 437-245.000.
Rhodes, Joseph C., Jr.; Moore, Victor S.; and Kraft, Wayne R., 4,685,080, Cl. 364-900.000.
Torres, Abraham, 4,685,078, Cl. 364-770.000.
International Computers Limited: *See*—
Loo, Johnson, 4,685,077, Cl. 364-759.000.
International Rolling Mill Consultants, Inc.: *See*—
Ginzburg, Vladimir B.; and Kaplan, Naum M., 4,683,744, Cl. 72-243.000.
Internationale Octrooi Maatschappij "Octropa" BV: *See*—
Smith, Richard D., 4,684,157, Cl. 285-256.000.
Inui, Toshiharu; Moriguchi, Haruhiko; Hisatake, Masayuki; and Ohmori, Takashi, to Fuji Xerox Co., Ltd. Heat storage correction apparatus. 4,685,069, Cl. 364-506.000.
Inuzuka, Hideo: *See*—
Emoto, Masami; and Inuzuka, Hideo, 4,684,799, Cl. 250-201.000.
Inuzuka, Yutaka: *See*—
Mochizuki, Hiroyuki; Kobayashi, Nobuo; Inuzuka, Yutaka; Aiba, Shigeo; and Nishi, Setsuo, 4,683,769, Cl. 74-422.000.
Investment Rarities, Incorporated: *See*—
Burandt, Corliss O., 4,683,848, Cl. 123-90.600.
IRI International Corporation: *See*—
Weisenfelder, Carl H., 4,683,994, Cl. 192-3.610.
IRSID: *See*—
Michelet, Jacques; and Maurer, Ghislain, 4,685,112, Cl. 373-72.000.
Irving, Wesley F.: *See*—
Blomstedt, John W.; Yoshida, Paul S.; Irving, Wesley F.; and Roudenko, Vladimir, 4,685,032, Cl. 361-412.000.
Irwin, Robert H.: *See*—
Plovanich, Charles J.; Ossont, Guy H.; King, Keith C.; Irwin, Robert H.; and Knoop, Walter V., 4,683,814, Cl. 100-37.000.
Ishibashi, Yoji: *See*—
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.
Ishida, Masato: *See*—
Takayanagi, Yoshiaki; Ishida, Masato; and Miura, Makoto, 4,684,239, Cl. 355-14.00R.
Ishida Scales Mfg. Co., Ltd.: *See*—
Koyama, Kazuo, 4,683,707, Cl. 53-502.000.
Nakagawa, Yukio; Kakita, Yukio; and Kitagawa, Kazumi, 4,683,966, Cl. 177-25.000.
Ishihara, Hiroshi: *See*—
Hono, Susumu; Okuda, Ichiro; Ishihara, Hiroshi; and Hori, Masahiko, 4,685,113, Cl. 375-7.000.
Ishihara, Koushi; Murakami, Yasuji; Yoshizawa, Nobuyuki; and Funaki, Kiyoshi, to Nippon Telegraph & Telephone Public Corporation; and Ocean Cable Co., Ltd. Submarine optical fiber cable with dam means. 4,684,213, Cl. 350-96.230.
Ishii, Takatoshi: *See*—
Nishi, Kazuhiko; Ishii, Takatoshi; Yamashita, Ryozo; Yamaoka, Shigemitsu; and Okumura, Takatoshi, 4,684,942, Cl. 340-703.000.
Ishii, Yoshinori: *See*—
Kobayashi, Susumu; Muramoto, Yutaka; Ishizaka, Hideo; and Ishii, Yoshinori, 4,684,869, Cl. 320-2.000.
Ishikawa, Haruo; and Fujii, Yoshimasa, to Sumitomo Metal Mining Company Limited. Optical branching element. 4,684,208, Cl. 350-96.150.
Ishiyama, Takashi: *See*—
Motai, Hiroshi; Fukushima, Yaichi; and Ishiyama, Takashi, 4,684,527, Cl. 426-46.000.
Ishizaka, Hideo: *See*—
Kobayashi, Susumu; Muramoto, Yutaka; Ishizaka, Hideo; and Ishii, Yoshinori, 4,684,869, Cl. 320-2.000.
Ishizaka, Michihiro: *See*—
Shikama, Toshihiro; Ota, Takahisa; Ishizaka, Michihiro; Kira, Hirofumi; Horiguchi, Akira; and Kooi, Yuji, 4,685,105, Cl. 370-86.000.
Ishizuka, Kouichi: *See*—
Masuda, Toshiro; Ishizuka, Kouichi; Fujita, Toshiji; and Kinoshita, Yoshio, 4,685,139, Cl. 382-1.000.
Isoi, Masaaki: *See*—
Inoue, Hiroshi; Miyazaki, Makoto; Isoi, Masaaki; and Yoda, Makoto, 4,684,578, Cl. 428-462.000.
Isoyama, Toyoshiro: *See*—
Kitano, Kisei; Ogawa, Tetsuya; Furukawa, Yoshito; Yoshida, Naoyuki; Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; and Nigorikawa, Kazunori, 4,684,476, Cl. 252-299.610.
Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Ogawa, Tetsuya; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,684,478, Cl. 252-299.630.
Issautier, Gerald. Haemodialysis device automatically monitoring loss of weight. 4,684,460, Cl. 210-90.000.
Issenmann, Olivier, to Geoservices. Device for transmitting to the surface the signal from a transmitter located at a great depth. 4,684,946, Cl. 340-855.000.
Isuzu Motors Limited: *See*—
Hattori, Toshihiro; Uchiyama, Nobuichi; Asagi, Yasuyoshi; Ogawa, Noriaki; and Kasai, Hitoshi, 4,683,996, Cl. 192-0.033.
Hattori, Toshihiro; Shishido, Katsuya; Kasai, Hitoshi; Moride, Shigeki; and Ogawa, Noriaki, 4,685,051, Cl. 364-424.100.
Kawamura, Hideo; Yoshida, Yukio; and Yamashita, Keiichi, 4,684,341, Cl. 431-242.000.
Uriuhara, Makoto; and Ohmori, Atsushi, 4,685,062, Cl. 364-424.100.

Itagaki, Takafumi, to Tamatoshi Industries Limited. Structure for coupling a bar-like member. 4,684,286, Cl. 403-407.100.
Itil, Turan M.: *See—*
Johansson, Nils E.; Eralp, Emin; and Itil, Turan M., 4,683,892, Cl. 128-639.000.
Itoh, Katsuhisa; Watanabe, Yoshiaki; Nakamura, Eiji; and Toyoshima, Masayasu, to Sumitomo Light Metal Industries, Ltd. Process of producing neodymium-iron alloy. 4,684,448, Cl. 204-71.000.
ITT Corporation: *See—*
Butler, Ronald G.; Lehman, John R.; Gray, Douglas S.; and Houck, Wayne R., 4,683,906, Cl. 137-375.000.
ITT Industries, Inc.: *See—*
Larsson, Hans, 4,683,718, Cl. 60-327.000.
ITW de France, D.A.: *See—*
Ambal, Gilbert, 4,683,611, Cl. 16-225.000.
Iversen, Arthur H. Liquid cooled stationary anode tubes. 4,684,844, Cl. 313-30.000.
Ivinsky, Vasily I.: *See—*
Kostylev, Alexandr D.; Ivinsky, Vasily I.; Filonov, Alexandr D.; and Klimashko, Vladimir V., 4,683,960, Cl. 173-91.000.
Iwaki Co., Ltd.: *See—*
Hirakawa, Norishige; Okada, Kazuo; and Sato, Kazuhiko, 4,684,333, Cl. 417-420.000.
Iwamoto, Hisao: *See—*
Watanabe, Nobuhisa; Iwamoto, Hisao; Nasuno, Toshihiro; and Sakamaki, Yoshio, 4,684,017, Cl. 206-235.000.
Iwaoka, Hideto: *See—*
Yamaguchi, Keiki; Hoshino, Kazuya; and Iwaoka, Hideto, 4,684,889, Cl. 324-308.000.
Iwasa, Yamahiro, to Asahi Chemical Research Laboratory Co., Ltd. Method for producing a multilayer printed-circuit board. 4,683,653, Cl. 29-830.000.
Iwasa, Yamahiro; Kabe, Atsushi; and Oba, Yoichi, to Asahi Chemical Research Laboratory Co., Ltd. Automatic soldering apparatus and method of using the flux to heat the circuit board. 4,684,054, Cl. 228-180.100.
Iwasawa, Toshiyuki: *See—*
Miura, Masayoshi; and Iwasawa, Toshiyuki, 4,684,957, Cl. 346-1.100.
Iya, Sridhar K., to Union Carbide Corporation. Zone heating for fluidized bed silane pyrolysis. 4,684,513, Cl. 423-349.000.
Izzo, Henry J., to Lever Brothers Company. Aqueous butter flavored composition, preparation and use. 4,684,532, Cl. 426-533.000.
J.M. Voith GmbH: *See—*
Meinecke, Albrecht; Schmid, Hans-Rainer; and Egelhof, Dieter, 4,684,444, Cl. 162-380.000.
Jackle, Horst, to Johann Jackle Metallwarenfabrik, GmbH & Co. Astronomical clock. 4,684,260, Cl. 368-16.000.
Jackson, John; and Angadjivand, Seyed A., to University of Strathclyde. Electro-conductive elastomeric materials. 4,684,481, Cl. 252-510.000.
Jacobs Manufacturing Company, Limited, The: *See—*
Derbyshire, George C., 4,684,139, Cl. 279-62.000.
Jacobs, Paul J., to T. O. Plastics, Inc. Automatic loading tray for thin-walled plastic flower pots. 4,684,013, Cl. 206-423.000.
Jager, Kornelis: *See—*
De Wit, Hendrik J.; Brouha, Marcel; Enz, Ulrich E.; Jager, Kornelis; Van Der Borst, Albertus J. C.; and Turk, Gijsbertus W., 4,685,012, Cl. 360-125.000.
James, Claude: *See—*
Fabre, Jean-Louis; Farge, Daniel; James, Claude; and Lave, Daniel, 4,684,658, Cl. 514-338.000.
Jankowski, Stephen J.: *See—*
Purlia, John M.; and Jankowski, Stephen J., 4,683,603, Cl. 15-104.940.
Japan Bano'k Co., Ltd.: *See—*
Furutsu, Akira, 4,683,920, Cl. 140-93.00A.
Japan Synthetic Rubber Co., Ltd.: *See—*
Fujiwara, Shuetsu; Andoh, Naoki; and Hosotani, Kenji, 4,684,738, Cl. 549-242.000.
Jarrett, Steven M.: *See—*
Carlson, Lee R.; Hegedus, Denes A.; Jarrett, Steven M.; Miller, Michael F.; Riley, Martin E.; and Wright, David L., 4,685,109, Cl. 372-61.000.
Jarund, Erik, to Devello AB. Thermometer sheath. 4,684,018, Cl. 206-306.000.
Jasinski, Joseph M.; Meyerson, Bernard S.; and Scott, Bruce A., to International Business Machines Corporation. Low pressure chemical vapor deposition of tungsten silicide. 4,684,542, Cl. 437-245.000.
Jbach, Hermann-Wolf: *See—*
Kunert, Heinz; and Jbach, Hermann-Wolf, 4,684,571, Cl. 428-314.800.
Jee, Kwang Koo: *See—*
Shin, Myung Chul; Kim, Chil Sung; Chung, Young Hoon; and Jee, Kwang Koo, 4,683,721, Cl. 60-527.000.
Jenkins, John W.; and Laubach, William F., to TRW Inc. Zero insertion force connector. 4,684,194, Cl. 439-260.000.
Jensen, Craig M.: *See—*
Trogler, William C.; and Jensen, Craig M., 4,684,751, Cl. 568-898.000.
Jinda, Kazuya: *See—*
Ashitaka, Hidetomo; Jinda, Kazuya; and Miwa, Yoshiyuki, 4,684,717, Cl. 534-586.000.
Ashitaka, Hidetomo; Jinda, Kazuya; and Miwa, Yoshiyuki, 4,684,718, Cl. 534-586.000.
JMC Acrylguss GmbH & Co.: *See—*
Kunert, Heinz; and Jbach, Hermann-Wolf, 4,684,571, Cl. 428-314.800.
Joannou, Kyriacos; and Downs, Daniel C., to Pericomp Corp. Magnetic tape head alignment system. 4,685,013, Cl. 360-121.000.
Johann Jackle Metallwarenfabrik, GmbH & Co.: *See—*
Jackle, Horst, 4,684,260, Cl. 368-16.000.
Johannes, Kurt J., to U.S. Philips Corporation. Circuit arrangement for detecting the vertical blanking periods in a picture signal. 4,684,988, Cl. 358-154.000.
Johansson, Nils E.; Eralp, Emin; and Itil, Turan M. Method and apparatus for conducting brain function diagnostic test. 4,683,892, Cl. 128-639.000.
John D. Brush & Co., Inc.: *See—*
Beattie, Patrick J., 4,683,732, Cl. 70-118.000.
John Wyeth & Brother Limited: *See—*
Boyle, John T. A., 4,684,657, Cl. 514-313.000.
Johns Hopkins University, The: *See—*
Potember, Richard S.; and Poehler, Theodore O., 4,684,598, Cl. 430-269.000.
Johnsen, Hawk; and Johnsen, Kaare. Method for finishing steel shapes with magnetite and product obtained therefrom. 4,684,411, Cl. 134-15.000.
Johnsen, Kaare: *See—*
Johnsen, Hawk; and Johnsen, Kaare, 4,684,411, Cl. 134-15.000.
Johnson, Bruce S.; and Taylor, Dennis M., to Finnigan Corporation. Electron source assembly with a replaceable filament ribbon. 4,684,204, Cl. 439-863.000.
Johnson, Charles B.; Box, Jeffrey L.; and Hildebrand, David B., to SRX Corporation. Distributed switching system. 4,685,104, Cl. 370-67.000.
Johnson, Clifford T.: *See—*
Miller, Larry J.; Rattlingourd, Glen D.; and Johnson, Clifford T., 4,685,106, Cl. 370-112.000.
Johnson, Mark: *See—*
DiStefano, Thomas H.; Hollis, Ralph L., Jr.; Johnson, Mark; and Wang, Sherman S., 4,684,547, Cl. 427-131.000.
Johnson, Ralph K.; Azmi, Kaya; Keyes, Marion A., IV; and Moss, William H., to Babcock & Wilcox Company, The. Steam generator on-line efficiency monitor. 4,685,072, Cl. 364-551.000.
Johnson, William M., to Charles Stark Draper Laboratory, Inc., The. Common optical aperture laser separator for reciprocal path optical. 4,684,796, Cl. 250-201.000.
Joly, Pascale: *See—*
Romeo, Francoise; and Joly, Pascale, 4,684,997, Cl. 358-263.000.
Jones, Brian D., to Strategic Energy Services, Inc. Method and apparatus for the installation and modification of oil well evacuation systems. 4,683,946, Cl. 166-170.000.
Jones, Kathleen K. Urinal for use by females. 4,683,598, Cl. 4-301.000.
Jones, Ronald D.; and Cross, Joseph B., to Phillips Petroleum Company. Solid particle dispensing. 4,684,041, Cl. 222-161.000.
Jonovic, John A.; Stengel, Bruce W.; and Mally, Timothy G., to Oscar Mayer Foods Corporation. Rotary volumetric piston dispenser with adjustable camming assembly, and rinsing device. 4,684,040, Cl. 222-148.000.
Joosten, Richard L.: *See—*
Rangwala, Badrudden K.; Rodocker, Frank A.; Pawloski, Curtis H.; and Joosten, Richard L., 4,683,701, Cl. 53-167.000.
Jordan, Marvin F.: *See—*
Meredith, Michael D.; Bentvelzen, Joseph M.; and Jordan, Marvin F., 4,684,442, Cl. 162-242.000.
Jorgensen, Robert J.: *See—*
Wagner, Burkhard E.; Karol, Frederick J.; Goeke, George L.; Jorgensen, Robert J.; and Friis, Nils, 4,684,703, Cl. 526-88.000.
Joseph Pollak Corporation: *See—*
Beck, Willi K.; Danielson, Lincoln V.; and Strange, Andrew, 4,684,769, Cl. 200-61.890.
Jujo Paper Co., Ltd.: *See—*
Higuchi, Takayoshi; Tanahashi, Mitsuhiko; and Mastukura, Motoo, 4,684,740, Cl. 549-464.000.
Jung, Dae Y.: *See—*
Fey, Edmond O.; Haselbauer, Peter; Jung, Dae Y.; Kaschak, Ronald A.; Kilthau, Hans-Dieter; Magnuson, Roy H.; and Wagner, Robert J., 4,684,545, Cl. 427-98.000.
Jung, Johann: *See—*
Rentzea, Costin; Sauter, Hubert; Zeeh, Bernd; Heilen, Gerd; and Jung, Johann, 4,684,392, Cl. 71-76.000.
Jung, Rainer: *See—*
Hutter, Odo; and Jung, Rainer, 4,684,010, Cl. 198-765.000.
Jurgensen, Bruce A. Power beam for rotating structural member. 4,683,677, Cl. 49-200.000.
Kabe, Atsushi: *See—*
Iwasa, Yamahiro; Kabe, Atsushi; and Oba, Yoichi, 4,684,054, Cl. 228-180.100.
Kabushiki Kaisha Daikin Seisakusho: *See—*
Takeuchi, Hiroshi, 4,684,002, Cl. 192-70.250.
Kabushiki Kaisha Fuji Kikaku: *See—*
Ueno, Toshio, 4,684,529, Cl. 426-237.000.
Kabushiki Kaisha Kobe Seiko Sho: *See—*
Asari, Akira; Yamamura, Takashige; Hattori, Shigeo; and Ueno, Tsuneya, 4,683,630, Cl. 29-159.010.
Kabushiki Kaisha Kyoto Daiichi Kagaku: *See—*
Yamamoto, Hiroshi, 4,685,059, Cl. 364-415.000.
Kabushiki Kaisha Toshiba: *See—*
Ando, Hideo; and Doi, Akihiko, 4,684,797, Cl. 250-201.000.
Kawano, Mitsumo, 4,684,901, Cl. 331-25.000.

Kojima, Fumitoshi; and Mitomi, Mitchio, 4,684,893, Cl. 324-312.000.
Nakasuji, Mamoru, 4,684,809, Cl. 250-492.200.
Ooi, Katsunori; Hidai, Yutaka; Kurosawa, Yoshiaki; and Nakamura, Yoshikatsu, 4,685,142, Cl. 382-13.000.
Tanaka, Shigeru; and Takagi, Isamu, 4,684,766, Cl. 174-115.000.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Sakata, Masataka; Takasu, Shigeo; and Ikimi, Yoshihiro, 4,683,987, Cl. 187-9.00E.
Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo: *See*—
Ueno, Ryuzo; Sakota, Kazuyuki; and Nakamura, Yasunori, 4,684,712, Cl. 528-190.000.
Kafka, James D.; Baer, Thomas M.; and Head, David F., to Spectra-Physics, Inc. Dispersion compensated fiber Raman oscillator. 4,685,107, Cl. 372-6.000.
Kago, Yoshiyuki: *See*—
Kitamura, Sotoo; Akita, Shigeyuki; and Kago, Yoshiyuki, 4,684,943, Cl. 340-825.720.
Kahkipuro, Matti, to Elevator GmbH. Method and drive for elevator DC drive motor stabilization. 4,684,856, Cl. 318-310.000.
Kaieda, Osamu; Awashima, Masaru; Okitaka, Isao; and Nakamura, Toshiaki, to Nippon Shokubai KK Co., Ltd. Method for manufacture or organic fluorine compounds. 4,684,734, Cl. 546-345.000.
Kaijo Denki Co., Ltd.: *See*—
Morita, Yukiji; and Yoshida, Masafumi, 4,685,075, Cl. 364-569.000.
Kaiser, Robert H.: *See*—
Lee, Young E.; Downing, James H.; and Kaiser, Robert H., 4,684,403, Cl. 75-80.000.
Kajita, Yasuyuki: *See*—
Oshima, Junji; Yamada, Minoru; and Kajita, Yasuyuki, 4,684,695, Cl. 525-36.000.
Kakita, Yukio: *See*—
Nakagawa, Yukio; Kakita, Yukio; and Kitagawa, Kazumi, 4,683,966, Cl. 177-25.000.
Kalafus, Rudolph M., to United States of America, Transportation. VHF/radar transponder collision avoidance aid. 4,684,949, Cl. 342-41.000.
Kaljas Pty. Limited: *See*—
Kalocsai, Guy I. Z., 4,684,404, Cl. 75-118.00R.
Kallos, Joseph. Permanent magnet direct current motor apparatus. 4,684,855, Cl. 318-254.000.
Kalman, Peter, to Caterpillar Inc. Track support for supporting a flexible track. 4,683,632, Cl. 29-281.100.
Kalocsai, Guy I. Z., to Kaljas Pty. Limited. Dissolution of noble metals. 4,684,404, Cl. 75-118.00R.
Kamal, Nabil. Picking and separating device for transporting one or more fabric piles from a stack. 4,684,120, Cl. 271-18.300.
Kamhuber, Peter, to Erste Wiener Wach- und Schliessgesellschaft AG; and "Niwe" Ing. Kamhuber & Co. KG. Device for acquiring, storing and evaluating the data of a checking process. 4,684,793, Cl. 235-449.000.
Kamihigoshi, Tutomu: *See*—
Okamura, Kazuo; Koyama, Satoshi; Maeda, Tadayuki; and Kamihigoshi, Tutomu, 4,684,591, Cl. 429-218.000.
Kamoshita, Katsuzo: *See*—
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,684,397, Cl. 71-96.000.
Kando, Giichi; and Tomoyori, Makoto, to Alps Electric Co., Ltd. Thermal head method of manufacturing. 4,683,646, Cl. 29-611.000.
Kanebo Limited: *See*—
Watanabe, Nobuhisa; Iwamoto, Hisao; Nasuno, Toshihiro; and Sakamaki, Yoshio, 4,684,017, Cl. 206-235.000.
Kanemitsu, Kimihiro: *See*—
Nishikawa, Yoshihiro; Kanemitsu, Kimihiro; Katori, Tatsuhiko; Shibata, Akihiro; and Kukita, Kenichi, 4,684,719, Cl. 536-119.000.
Kaneshige, Isao: *See*—
Satoh, Kenji; Kaneshige, Isao; and Ikari, Kyoichiro, 4,684,564, Cl. 428-216.000.
Kanjo, Wajih, to American Standard Inc. Actuating means for a slack adjuster overtravel control mechanism. 4,683,991, Cl. 188-197.000.
Kanodia, Vinod L., to General Motors Corporation. Vehicle door impact beam and stabilizing assembly. 4,684,166, Cl. 296-146.000.
Kaplan, Naum M.: *See*—
Ginzburg, Vladimir B.; and Kaplan, Naum M., 4,683,744, Cl. 72-243.000.
Kappas, Attallah; and Drummond, George, to Rockefeller University, The. Method of decreasing rate of heme metabolism. 4,684,637, Cl. 514-185.000.
Kappler, Inc.: *See*—
Langley, John D., 4,683,593, Cl. 2-82.000.
Kar, Nareshchandra J.; Salesky, William J.; and Guzowski, Steven J., to Smith International, Inc. Cast steel rock bit cutter cones having metallurgically bonded cutter inserts, and process for making the same. 4,683,781, Cl. 76-108.00A.
Karaki, Kouichi: *See*—
Imade, Shinichi; and Karaki, Kouichi, 4,683,751, Cl. 73-606.000.
Karam, Ronald E.: *See*—
Faria, Sixdeniel; and Karam, Ronald E., 4,684,595, Cl. 430-94.000.
Karjalainen, Arto J.; and Kurkela, Kauko O. A., to Farmos-Yhtyma Oy. Antimypertensive substituted imidazoles. 4,684,659, Cl. 514-396.000.
Karlsson, Jan, to KB Vindkraft i Goteborg. Improvements in wind turbine having a wing-profiled diffusor. 4,684,316, Cl. 415-2.00A.
Karol, Frederick J.: *See*—
Wagner, Burkhard E.; Karol, Frederick J.; Goeke, George L.; Jorgensen, Robert J.; and Friis, Nils, 4,684,703, Cl. 526-88.000.
Kasai, Hitoshi: *See*—
Hattori, Toshihiro; Uchiyama, Nobuichi; Asagi, Yasuyoshi; Ogawa, Noriaki; and Kasai, Hitoshi, 4,683,996, Cl. 192-0.033.
Hattori, Toshihiro; Shishido, Katsuya; Kasai, Hitoshi; Moride, Shigeki; and Ogawa, Noriaki, 4,685,051, Cl. 364-424.100.
Kasaoka, Katsuyuki: *See*—
Sasaki, Yoshiyuki; and Kasaoka, Katsuyuki, 4,684,566, Cl. 428-224.000.
Kaschak, Ronald A.: *See*—
Fey, Edmond O.; Haselbauer, Peter; Jung, Dae Y.; Kaschak, Ronald A.; Kilthau, Hans-Dieter; Magnuson, Roy H.; and Wagner, Robert J., 4,684,545, Cl. 427-98.000.
Katayama, Megumi: *See*—
Hirata, Terutaka; Azegami, Tadashi; Kimura, Atsushi; and Katayama, Megumi, 4,683,754, Cl. 73-708.000.
Katchka, Jay R., to Robertshaw Controls Company. Burner construction and method of making the same. 4,684,340, Cl. 431-80.000.
Kato, Katsushi: *See*—
Tamura, Hiroshi; Nishibori, Kazuyoshi; Yamauchi, Yasutaka; and Kato, Katsushi, 4,683,859, Cl. 123-491.000.
Kato, Masahiro: *See*—
Kimata, Kei; Kato, Masahiro; and Shibata, Ko, 4,684,356, Cl. 464-111.000.
Kato, Masatake: *See*—
Ikemori, Keiji; and Kato, Masatake, 4,684,223, Cl. 350-427.000.
Kato, Masumi: *See*—
Handa, Takayuki; Takeuchi, Yasushi; Kato, Masumi; and Seki, Hisazi, 4,684,430, Cl. 156-366.000.
Katoh, Sumio: *See*—
Sugihara, Shoichi; and Katoh, Sumio, 4,684,976, Cl. 358-31.000.
Katori, Tatsuhiko: *See*—
Nishikawa, Yoshihiro; Kanemitsu, Kimihiro; Katori, Tatsuhiko; Shibata, Akihiro; and Kukita, Kenichi, 4,684,719, Cl. 536-119.000.
Katz, Howard G.: *See*—
Yannich, Marie E.; and Katz, Howard G., 4,684,689, Cl. 524-371.000.
Kaufman, Harold R.; and Robinson, Raymond S., to Kaufman & Robinson, Inc. Broad-beam electron source. 4,684,848, Cl. 315-111.810.
Kaufman & Robinson, Inc.: *See*—
Kaufman, Harold R.; and Robinson, Raymond S., 4,684,848, Cl. 315-111.810.
Kawai Musical Instrument Mfg. Co., Ltd.: *See*—
Deutsch, Ralph, 4,683,793, Cl. 84-1.010.
Kawamura, Hideaki; and Otsuki, Toshiaki, to Fanuc Ltd. Interface unit between a numerical controller and an electric power control circuit. 4,684,861, Cl. 318-567.000.
Kawamura, Hideo; Yoshida, Yukio; and Yamashita, Keiichi, to Isuzu Motors, Ltd. Fuel vaporization apparatus for combustor. 4,684,341, Cl. 431-242.000.
Kawano, Mitsumo, to Kabushiki Kaisha Toshiba. Automatic phase control circuit. 4,684,901, Cl. 331-25.000.
Kawasaki, Akihisa; Tada, Kohji; Kotani, Toshihiro; and Miyazawa, Shintaro, to Sumitomo Electric Industries, Ltd.; and Nippon Telegraph and Telephone Public Corp. Single crystal article. 4,684,515, Cl. 423-495.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Doi, Yoshiki; Inabe, Mitsuo; and Noro, Osamu, 4,683,723, Cl. 62-6.000.
Fujikawa, Tetsuzo; Hirata, Makizo; and Tamba, Shinichi, 4,683,847, Cl. 123-90.200.
Hashimoto, Isao; Kinoshita, Tosuke; Uchida, Masahiro; and Uchiyama, Susumu, 4,684,069, Cl. 241-79.100.
Nishida, Hiroshi, 4,683,829, Cl. 114-125.000.
Kawashima, Osamu: *See*—
Taniguchi, Masao; Morita, Yoshiharu; Hayakawa, Shuzo; and Kawashima, Osamu, 4,684,732, Cl. 546-144.000.
Kay, Edward L.; and Gutierrez, Richard, to Firestone Tire & Rubber Company, The. Extraction of rubber and/or resin from rubber containing plants with a monophase solvent mixture. 4,684,715, Cl. 528-493.000.
Kazami, Kazuyuki, to Nippon Kogaku K. K. Method and apparatus for controlling operation of camera. 4,684,232, Cl. 354-400.000.
KB Vindkraft i Goteborg: *See*—
Karlsson, Jan, 4,684,316, Cl. 415-2.00A.
Kearney, Mark B.: *See*—
Shreve, John R.; and Kearney, Mark B., 4,684,877, Cl. 323-269.000.
Keintzel, Gunter; and Westebbe, Klaus, to L. & C. Steinmuller GmbH. Apparatus for drying wet steam and subsequently superheating the dried steam. 4,683,842, Cl. 122-483.000.
Kellams, Roger W.: *See*—
House, Ronnalee; and Kellams, Roger W., 4,684,202, Cl. 439-752.000.
Keller, Jack W.: *See*—
Elam, Paul A.; and Keller, Jack W., 4,683,930, Cl. 152-410.000.
Kelley, Charles D.: *See*—
Butts, Gene A.; Garsee, Henry A.; Kelley, Charles D.; Petty, Bruce R.; and Pauley, James L., 4,684,244, Cl. 356-39.000.
Kelly, Rickey L.: *See*—
Horn, Charles; Kelly, Rickey L.; Orendorf, Thomas E.; and Kiger, Terry L., 4,684,309, Cl. 414-224.000.
Kempsmith Machine Company: *See*—
Gohr, Robert A., 4,684,433, Cl. 156-517.000.

Kennecott Corporation: *See*—
Bower, Terry F.; Randlett, M. Ronald; and Shinopulos, George, 4,683,938, Cl. 164-413.000.
Kennedy, Richard T.: *See*—
Wasserstrom, Henry; and Kennedy, Richard T., 4,684,039, Cl. 222-129.100.
Kenyon, Richard L., to Parker Hannifin Corporation. Inverted pump. 4,684,368, Cl. 604-152.000.
Kera Corporation: *See*—
Mount, Houston B., II, 4,685,140, Cl. 382-6.000.
Kerlin, Jack H., to Balance Dynamics Co. Remote control system for rotary device. 4,684,944, Cl. 340-825.060.
Kersten, Gunther; Klauss, Walter; and Michl, Jurgen, to Traub AG. Numerically controlled lathe. 4,683,786, Cl. 82-2.00B.
Kerttula, Reima; and Viitanen, Olavi, to Valmet Oy. Apparatus for guiding a web leader in a paper machine. 4,684,443, Cl. 162-255.000.
Kessen, Gunther; Cornils, Boy; Gick, Wilhelm; Wiebus, Ernst; Hibbel, Joseph; Bach, Hanswilhelm; and Zgorzelski, Wolfgang, to Ruhrchemie Aktiengesellschaft. Process for the production of 2-ethyl-hexanol. 4,684,750, Cl. 568-883.000.
Ketek Inc.: *See*—
Whitaker, Charles D., 4,685,061, Cl. 364-424.000.
Keusch, Preston; and Essmyer, John L., to Nepera Inc. Adhesive polyethylene oxide hydrogel sheet and its production. 4,684,558, Cl. 428-40.000.
Keyes, Marion A., IV: *See*—
Johnson, Ralph K.; Azmi, Kaya; Keyes, Marion A., IV; and Moss, William H., 4,685,072, Cl. 364-551.000.
Khuri-Yakub, Butrus T.: *See*—
Kino, Gordon S.; Stearns, Richard G.; and Khuri-Yakub, Butrus T., 4,683,750, Cl. 73-606.000.
Kia Motors Corp.: *See*—
Ha, Jung Yong, 4,684,177, Cl. 303-100.000.
Kiger, Terry L.: *See*—
Horn, Charles; Kelly, Rickey L.; Orendorf, Thomas E.; and Kiger, Terry L., 4,684,309, Cl. 414-224.000.
Kikkoman Corporation: *See*—
Motai, Hiroshi; Fukushima, Yaichi; and Ishiyama, Takashi, 4,684,527, Cl. 426-46.000.
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, to Mitsubishi Chemical Industries Limited. Alkylenedioxybenzene and acid addition salts thereof useful as hypotensives. 4,684,651, Cl. 514-253.000.
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, to Mitsubishi Chemical Industries Limited. Alkylenedioxybenzene derivatives and acid addition salts thereof. 4,684,739, Cl. 549-350.000.
Killian, John J., III: *See*—
Wickman, John A.; and Killian, John J., III, 4,683,731, Cl. 70-69.000.
Kilthau, Hans-Dieter: *See*—
Fey, Edmond O.; Haselbauer, Peter; Jung, Dae Y.; Kaschak, Ronald A.; Kilthau, Hans-Dieter; Magnuson, Roy H.; and Wagner, Robert J., 4,684,545, Cl. 427-98.000.
Kiltie, Ordean; and Marrs, Thomas C., to Marshall Electric Corporation. Winding form for high voltage transformer. 4,684,912, Cl. 336-185.000.
Kim, Chil Sung: *See*—
Shin, Myung Chul; Kim, Chil Sung; Chung, Young Hoon; and Jee, Kwang Koo, 4,683,721, Cl. 60-527.000.
Kim, Yong J.: *See*—
Min, Seong K.; Kim, Yong J.; Lee, Hee W.; and Chun, Chul G., 4,685,009, Cl. 360-95.000.
Kimata, Kei; Kato, Masahiro; and Shibata, Ko, to NTN Toyo Bearing Co., Ltd. Roller bearing assemblies for a homokinetic universal joint. 4,684,356, Cl. 464-111.000.
Kimberly-Clark Corporation: *See*—
Soerens, Dave A., 4,684,439, Cl. 162-111.000.
Kimura, Atsushi: *See*—
Hirata, Terutaka; Azegami, Tadashi; Kimura, Atsushi; and Katayama, Megumi, 4,683,754, Cl. 73-708.000.
Kimura, Hidetoshi: *See*—
Matsui, Isamu; Kimura, Hidetoshi; and Nakanishi, Kazuo, 4,683,713, Cl. 57-281.000.
Kimura, Shin-Ichiro; Murakami, Eiichi; Warabisako, Terunori; Miyake, Kiyoshi; and Sunami, Hideo, to Hitachi, Ltd. Plasma treatment system. 4,683,838, Cl. 118-715.000.
Kinas, Ryszard: *See*—
Stec, Wojciech; Kinas, Ryszard; and Misiura, Konrad, 4,684,742, Cl. 558-81.000.
King, Keith C.: *See*—
Plovanich, Charles J.; Ossont, Guy H.; King, Keith C.; Irwin, Robert H.; and Knoop, Walter V., 4,683,814, Cl. 100-37.000.
Kino, Gordon S.; Stearns, Richard G.; and Khuri-Yakub, Butrus T., to Leland Stanford Junior University, The Board of Trustees of the. Thermal acoustic probe. 4,683,750, Cl. 73-606.000.
Kinoshita, Mitsuo; and Obara, Haruki, to Fanuc Ltd. Electric discharge machining condition setting system. 4,685,064, Cl. 364-474.000.
Kinoshita, Tomoaki; Takano, Kunio; Okiyama, Yoichi; and Tachikawa, Osamu, to Tokyo Juki Industrial Co., Ltd. Movement control apparatus for sewing machine. 4,683,827, Cl. 112-121.120.
Kinoshita, Toshio; and Hiyama, Naoki, to Du Pont de Nemours, E. I., and Company. Connector for flexible printed circuit. 4,684,183, Cl. 439-77.000.
Kinoshita, Tosuke: *See*—
Hashimoto, Isao; Kinoshita, Tosuke; Uchida, Masahiro; and Uchiyama, Susumu, 4,684,069, Cl. 241-79.100.
Kinoshita, Yoshio: *See*—
Masuda, Toshiro; Ishizuka, Kouichi; Fujita, Toshiji; and Kinoshita, Yoshio, 4,685,139, Cl. 382-1.000.
Kinoshita, Yusuke: *See*—
Arai, Takeo; Anno, Nobuo; Kinoshita, Yusuke; and Kusakabe, Yukio, 4,683,844, Cl. 123-41.740.
Kinugawa, Masumi: *See*—
Sato, Yoshihisa; Kinugawa, Masumi; Akiyama, Susumu; Yamada, Toshitaka; Mizuno, Tiaki; and Suzuki, Atsushi, 4,683,858, Cl. 123-486.000.
Kira, Hirofumi: *See*—
Shikama, Toshihiro; Ota, Takahisa; Ishizaka, Michihiro; Kira, Hirofumi; Horiguchi, Akira; and Kooi, Yuji, 4,685,105, Cl. 370-86.000.
Kiriyama, Takashi: *See*—
Nishii, Michiharu; Furuta, Youichi; Tsubouchi, Kaoru; Murata, Takeo; Shibatani, Juichi; and Kiriyama, Takashi, 4,683,807, Cl. 92-169.000.
Kirschner Medical Corporation: *See*—
Carter, Dennis R., 4,683,878, Cl. 128-92.0YP.
Kishi, Kohhei; Koden, Mitsuhiro; and Funada, Fumiaki, to Sharp Kabushiki Kaisha. Method of manufacturing thin film transistor. 4,684,435, Cl. 156-632.000.
Kishimoto, Shoji: *See*—
Ochiai, Michihiko; Kishimoto, Shoji; and Matsuo, Taisuke, deceased, 4,684,724, Cl. 540-355.000.
Kiss, Zolton C., Jr. Rapid pistol sighting attachments. 4,683,662, Cl. 33-233.000.
Kit Man, Wai: *See*—
Greco, Joseph A., II; Hawkins, Donald K.; LeGrys, Scott R.; and Kit Man, Wai, 4,685,068, Cl. 364-518.000.
Kitagawa Industries Co., Ltd.: *See*—
Yagi, Masaru, 4,684,093, Cl. 248-201.000.
Kitagawa, Kazumi: *See*—
Nakagawa, Yukio; Kakita, Yukio; and Kitagawa, Kazumi, 4,683,966, Cl. 177-25.000.
Kitakaze, Seiji: *See*—
Tsuzurahara, Mamoru; Baba, Hidetsuyo; and Kitakaze, Seiji, 4,684,845, Cl. 313-341.000.
Kitamura, Makoto: *See*—
Tanabe, Hisao; Takahashi, Masaru; Ozawa, Hiroyasu; Machida, Shoichi; and Kitamura, Makoto, 4,683,993, Cl. 188-321.110.
Kitamura, Masatsugu; Wagatsuma, Kikuji; Watanabe, Tokumi; Yamashita, Naoki; and Yoshida, Hiroshi, to Victor Company of Japan. Periodic wave form generation by recyclically reading amplitude and frequency equalized digital signals. 4,683,795, Cl. 84-1.260.
Kitamura, Sotoo; Akita, Shigeyuki; and Kago, Yoshiyuki, to Nippon Soken, Inc. Unlocking device for a vehicle lid. 4,684,943, Cl. 340-825.720.
Kitano, Kisei; Ogawa, Tetsuya; Furukawa, Yoshito; Yoshida, Naoyuki; Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; and Nigorikawa, Kazunori, to Chisso Corporation. Pyrimidine derivative and liquid crystal composition containing same. 4,684,476, Cl. 252-299.610.
Kitano, Kisei: *See*—
Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Ogawa, Tetsuya; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,684,478, Cl. 252-299.630.
Kiyohara, Akio: *See*—
Sakai, Yasushi; Tanaka, Koji; Saito, Michio; and Kiyohara, Akio, 4,684,711, Cl. 528-86.000.
Klauss, Walter: *See*—
Kersten, Gunther; Klauss, Walter; and Michl, Jurgen, 4,683,786, Cl. 82-2.00B.
Klemarczyk, Philip T., to Loctite Corporation. Polysiloxane urethane compounds and adhesive compositions, and method of making and using the same. 4,684,538, Cl. 427-54.100.
Klembus, Nancy M.; and Detter, Gary C., to General Motors Corporation. Electrical connector assembly. 4,684,188, Cl. 339-59.00M.
Klemen, Donald, to General Motors Corporation. Transmission gearing arrangement. 4,683,776, Cl. 74-765.000.
Kleykamp, Donald L., to Dayco Products, Inc. Method of making a holddown bar for a hatch cover of a railroad car. 4,684,418, Cl. 156-91.000.
Klimashko, Vladimir V.: *See*—
Kostylev, Alexandr D.; Ivinsky, Vasily I.; Filonov, Alexandr D.; and Klimashko, Vladimir V., 4,683,960, Cl. 173-91.000.
Klimpel, Richard R.; and Hansen, Robert D., to Dow Chemical Company, The. Collector compositions for the froth flotation of mineral values. 4,684,459, Cl. 209-166.000.
Kline, Leonard J., Jr.; and Forsyth, Thomas C., III, to Ametek, Inc. Motor cooling fan housing. 4,684,835, Cl. 310-59.000.
Klinedinst, Keith A.; and Gary, Richard A., to GTE Laboratories Incorporated. Electrochemical cell. 4,684,583, Cl. 429-48.000.
KMS Fusion, Inc.: *See*—
Bird, Charles R.; and Rockett, Paul D., 4,685,119, Cl. 378-130.000.
Knapp, Edward J., Jr., to Gould Inc. Thermoplastic insulating barrier for a fillerless electric fuse. 4,684,915, Cl. 337-276.000.
Knightly, William H. Antistaling/conditioning agent in producing bakery products. 4,684,526, Cl. 426-19.000.
Knogo Corporation: *See*—
Minasy, Arthur J.; and Pokalsky, Peter A., 4,684,930, Cl. 340-551.000.

Knoop, Walter V.: *See—*
Plovanich, Charles J.; Ossont, Guy H.; King, Keith C.; Irwin, Robert H.; and Knoop, Walter V., 4,683,814, Cl. 100-37.000.
Kobayashi, Hideo: *See—*
Shimamura, Haruo; Kobayashi, Hideo; and Asakura, Masahiko, 4,683,860, Cl. 123-492.000.
Kobayashi, Masaharu: *See—*
Takahashi, Hiroaki; Kobayashi, Masaharu; Noguchi, Takaharu; Shibuya, Toshifumi; and Arai, Takao, 4,685,004, Cl. 360-32.000.
Kobayashi, Nobuo: *See—*
Mochizuki, Hiroyuki; Kobayashi, Nobuo; Inuzuka, Yutaka; Aiba, Shigeo; and Nishi, Setsuo, 4,683,769, Cl. 74-422.000.
Kobayashi, Susumu; Muramoto, Yutaka; Ishizaka, Hideo; and Ishii, Yoshinori, to Terumo Kabushiki Kaisha. Electronic clinical thermometer. 4,684,869, Cl. 320-2.000.
Kobayashi, Toshio: *See—*
Fujitaki, Kiyonori; and Kobayashi, Toshio, 4,684,839, Cl. 310-154.000.
Kobayashi, Yoshinobu: *See—*
Abe, Katsuhiro; Kobayashi, Yoshinobu; and Baba, Mitsushige, 4,684,684, Cl. 524-227.000.
Kocjan, Andrew J.: *See—*
Beck, Lawrence R.; Kocjan, Andrew J.; Natoli, Richard A.; and Liguore, Louis J., 4,684,765, Cl. 174-68.500.
Kodaira, Takanori; Namai, Akihiro; and Egawa, Akira, to Canon Kabushiki Kaisha. Photographic optical system drive device for camera. 4,684,233, Cl. 354-400.000.
Kodama, Roy K.; and Koneval, Donald J., to Gould, Inc. Disposable physiological pressure sensing system. 4,683,894, Cl. 128-675.000.
Koden, Mitsuhiro: *See—*
Kishi, Kohhei; Koden, Mitsuhiro; and Funada, Fumiaki, 4,684,435, Cl. 156-632.000.
Koga, Norimichi: *See—*
Kohyama, Katsuhisa; Miyamoto, Masaaki; Nakanishi, Hidemi; and Koga, Norimichi, 4,684,713, Cl. 528-315.000.
Koga, Toshio, to NEC Corporation. Encoder with selective indication of compression encoding and decoder therefor. 4,684,923, Cl. 340-347.0DD.
Kohmoto, Yujiro; and Tanimoto, Yoshihiro, to Sanyo Electric Co., Ltd. Image forming apparatus. 4,684,235, Cl. 355-3.00R.
Kohyama, Katsuhisa; Miyamoto, Masaaki; Nakanishi, Hidemi; and Koga, Norimichi, to Mitsubishi Chemical Industries Limited. Hydrocarbon terminated polyamide resin and process for producing the same. 4,684,713, Cl. 528-315.000.
Kojima, Fumitoshi; and Mitomi, Mitchio, to Kabushiki Kaisha Toshiba. Field gradient correction apparatus for compensating static field inhomogeneities in NMR imaging system. 4,684,893, Cl. 324-312.000.
Kolaska, Johannes; and Reiter, Norbert, to Fried. Krupp GmbH. Sintered tungsten carbide material and manufacturing method. 4,684,405, Cl. 75-240.000.
Kolbenschmidt Aktiengesellschaft: *See—*
Wacker, Erich; Landau, Ulrich; Sander, Wilfried; and Schellmann, Klaus, 4,683,808, Cl. 92-208.000.
Kolenc, Terrence J.; Bork, Carl R., Jr.; Steiss, William C.; Shufflebarger, Earl D.; and Tobbe, William P., to Nupro Company. Valve. 4,684,106, Cl. 251-335.200.
Komet Stahlhalter- und Werkzeugfabrik: *See—*
Eckle, Otto, 4,684,301, Cl. 409-232.000.
Kominiak, Andrew A.: *See—*
Luzzi, Glenn J.; and Kominiak, Andrew A., 4,684,764, Cl. 174-91.000.
Koneval, Donald J.: *See—*
Kodama, Roy K.; and Koneval, Donald J., 4,683,894, Cl. 128-675.000.
Konishiroku Photo Industry Co., Ltd.: *See—*
Nishijima, Toyoki; and Onodera, Kaoru, 4,684,603, Cl. 430-372.000.
Yasufuku, Yoshitaka; Nara, Masaji; and Akutsu, Shigeru, 4,684,572, Cl. 428-323.000.
Konrad, Gunther; Maak, Norbert; and Lieske, Edgar, to Henkel Kommanditgesellschaft auf Aktien. Oxidation hair dyes comprising m-phenylenediamine derivatives as coupling components. 4,684,371, Cl. 8-408.000.
Konrad Rosenbauer KG: *See—*
Hawelka, Walter; and Staudinger, Hermann, 4,683,976, Cl. 180-311.000.
Kooi, Yuji: *See—*
Shikama, Toshihiro; Ota, Takahisa; Ishizaka, Michihiro; Kira, Hirofumi; Horiguchi, Akira; and Kooi, Yuji, 4,685,105, Cl. 370-86.000.
Korea Advanced Institute of Science & Technology: *See—*
Shin, Myung Chul; Kim, Chil Sung; Chung, Young Hoon; and Jee, Kwang Koo, 4,683,721, Cl. 60-527.000.
Korsunsky, Iosif: *See—*
Grabbe, Dimitry G.; and Korsunsky, Iosif, 4,684,184, Cl. 439-64.000.
Kortschinski, Juri; Mintz, John D.; and Filter, Reinhard. Fault current diverter. 4,685,021, Cl. 361-42.000.
Kostylev, Alexandr D.; Ivinsky, Vasily I.; Filonov, Alexandr D.; and Klimashko, Vladimir V. Air-operated reversible percussive action machine. 4,683,960, Cl. 173-91.000.
Kotani, Toshihiro: *See—*
Kawasaki, Akihisa; Tada, Kohji; Kotani, Toshihiro; and Miyazawa, Shintaro, 4,684,515, Cl. 423-495.000.
Koto Electric Co., Ltd.: *See—*
Harada, Saburo, 4,684,763, Cl. 174-52.0FP.
Koukal, Anton. Jig carriage for a recessing and shaping machine used in woodworking. 4,683,925, Cl. 144-145.00R.
Koyama, Kazuo, to Ishida Scales Mfg. Co., Ltd. System for packaging, weighing and labeling articles. 4,683,707, Cl. 53-502.000.
Koyama, Satoshi: *See—*
Okamura, Kazuo; Koyama, Satoshi; Maeda, Tadayuki; and Kamihigoshi, Tutomu, 4,684,591, Cl. 429-218.000.
Kraft, Inc.: *See—*
Kratochvil, John F., 4,684,533, Cl. 426-575.000.
Kraft, Wayne R.: *See—*
Rhodes, Joseph C., Jr.; Moore, Victor S.; and Kraft, Wayne R., 4,685,080, Cl. 364-900.000.
Kraftwerk Union Aktiengesellschaft: *See—*
Kunz, Rainer; Stauner, Jakob; and Weber, Robert, 4,684,492, Cl. 376-203.000.
Krambeck, Frederick J.: *See—*
Avidan, Amos A.; Krambeck, Frederick J.; and Tabak, Samuel A., 4,684,757, Cl. 585-331.000.
Kramer, Clark: *See—*
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark, 4,683,886, Cl. 128-376.000.
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark, 4,683,887, Cl. 128-376.000.
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark, 4,683,888, Cl. 128-376.000.
Kramer, Donald: *See—*
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark, 4,683,886, Cl. 128-376.000.
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark, 4,683,887, Cl. 128-376.000.
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark, 4,683,888, Cl. 128-376.000.
Kramer, John: *See—*
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark, 4,683,886, Cl. 128-376.000.
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark, 4,683,887, Cl. 128-376.000.
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark, 4,683,888, Cl. 128-376.000.
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark. Counterbalance system for the top of a tanning bed. 4,683,886, Cl. 128-376.000.
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark. Air circulation system for a tanning system. 4,683,887, Cl. 128-376.000.
Kramer, Sharon D.; Kramer, John; Kramer, Donald; and Kramer, Clark. Audio sound system for a tanning system. 4,683,888, Cl. 128-376.000.
Krapf, Wallace A. Pivotally mounted scheduling boards. 4,684,099, Cl. 248-447.100.
Kratochvil, John F., to Kraft, Inc. Imitation cheese products. 4,684,533, Cl. 426-575.000.
Kraus, Friedrich; Matthias, Guenther; Wittmann, Otto; and Diem, Hans, to BASF Aktiengesellschaft. Aminoplast adhesive resin powder for wood-based materials or as a paper adhesive, which eliminates little formaldehyde, its preparation, and a formulated aminoplast adhesive resin powder. 4,684,690, Cl. 524-419.000.
Krause, Ludwig, to Saurer-Allma GmbH. Machine tool vice. 4,684,115, Cl. 269-136.000.
Krebs, Michael A.: *See—*
Chenot, Charles F.; Gray, Leslie F.; and Krebs, Michael A., 4,684,539, Cl. 427-64.000.
Krens, Frans A.: *See—*
Schilperoort, Robbert A.; Krens, Frans A.; and Wullems, George J., 4,684,611, Cl. 435-172.300.
Krevor, David H., to Raychem Corporation. Tubular article. 4,685,090, Cl. 367-20.000.
Krishnamurthy, Sundaram, to Eastman Kodak Company. Sterically hindered photographic coupler solvents and photographic elements employing same. 4,684,606, Cl. 430-546.000.
Kronawittleithner, Kurt; and Pfarrsbacher, Alfred, to Bergsmann Apparatebau Gesellschaft m.b.H. & Co. KG. Method of and apparatus for chip-cutting of workpieces. 4,683,788, Cl. 82-47.000.
Krone, Pamela A.: *See—*
Morehouse, Alpha L.; and Krone, Pamela A., 4,684,410, Cl. 127-40.000.
Kronseder, Hermann. Labeling station for bottles or the like. 4,683,835, Cl. 118-231.000.
Krovak, Premysl; and Salvet, Miroslav, to Ceskoslovenska akademie ved. Mixing or pumping apparatus for the treatment of flowable thin or highly viscous media. 4,684,614, Cl. 435-316.000.
Kruest, James R., to Applied Micro Circuits Corporation. Level shift circuit for interfacing between two different voltage levels using a current mirror circuit. 4,684,831, Cl. 307-475.000.
Krufka, Frank S., to RCA Corporation. Multiple array panel matrix measurement system. 4,684,982, Cl. 358-107.000.
Kruger, Tilmann: *See—*
Arnold, Werner; Grasser, Hans; Kruger, Tilmann; and Meisner, Alfred, 4,684,261, Cl. 368-107.000.
Kruggel, Frithjof: *See—*
Welzel, Peter; Kunisch, Franz; Stein, Hermann; Hiltmann nee Ponty, Aranka; and Kruggel, Frithjof, 4,684,626, Cl. 514-25.000.
Krystofik, Steven S.: *See—*
Sureau, Jean-Claude; and Krystofik, Steven S., 4,684,954, Cl. 343-909.000.

Kubota, Naohiro; and Nishimura, Atsushi, to Adeka Argus Chemical Co., Ltd. Polyacetal resin compositions having improved resistance to deterioration when exposed to light and containing alkylidene bis(benzotriazolyl phenols). 4,684,679, Cl. 524-91.000.

Kubota, Naohiro; Shibata, Toshihiro; and Nishimura, Atsushi, to Adeka Argus Chemical Co., Ltd. Thermosetting synthetic resin lacquer compositions having improved light stability. 4,684,680, Cl. 524-91.000.

Kuck, Gerd: *See—*
Plies, Erich; and Kuck, Gerd, 4,684,808, Cl. 250-396.00R.

Kuhlman Corporation: *See—*
Macemon, Herbert J.; Schlake, Randall L.; Fisher, John L.; Piatt, Clair E.; and Mohney, Hubert L. R., 4,683,919, Cl. 140-92.200.

Kukita, Kenichi: *See—*
Nishikawa, Yoshihiro; Kanemitsu, Kimihiro; Katori, Tatsuhiko; Shibata, Akihiro; and Kukita, Kenichi, 4,684,719, Cl. 536-119.000.

Kukka, Aarre; Tervamaki, Jukka; Nikulin, Heikki; and Vuorinen, Olavi, to Labsystems Oy. Set of cuvettes. 4,684,250, Cl. 356-246.000.

Kukla, Cassimer M.: *See—*
Hoffman, David W.; and Kukla, Cassimer M., 4,683,758, Cl. 73-780.000.

Kulkarni, Narayan M.: *See—*
Ravindhran, Kothandaraman S.; and Kulkarni, Narayan M., 4,683,641, Cl. 437-41.000.

Kunert, Heinz; and Jbach, Hermann-Wolf, to Vegla Vereinigte Glaswerke GmbH; and JMC Acrylguss GmbH & Co. Light diffusing insulating glass element. 4,684,571, Cl. 428-314.800.

Kunisch, Franz: *See—*
Welzel, Peter; Kunisch, Franz; Stein, Hermann; Hiltmann nee Ponty, Aranka; and Kruggel, Frithjof, 4,684,626, Cl. 514-25.000.

Kuntzmann, Jean C.; and Tikes, Jacques, to Thomson-CSF. Circular window for ultra-high frequency waveguide. 4,684,908, Cl. 333-252.000.

Kunz, Cleon V., to United Technologies Corporation. Axial flow compressor case. 4,684,320, Cl. 415-190.000.

Kunz, Rainer; Stauner, Jakob; and Weber, Robert, to Kraftwerk Union Aktiengesellschaft. Repair fixture. 4,684,492, Cl. 376-203.000.

Kuo, James C.: *See—*
Derr, W. Rodman, Jr.; Garwood, William E.; Kuo, James C.; Leib, Tiberiu M.; Nace, Donald M.; and Tabak, Samuel A., 4,684,756, Cl. 585-330.000.

Kupec, Peter; Metzner, Uwe; and Thilo, Peer, to Siemens Aktiengesellschaft. Method and arrangement for measuring changes of capacitive state at a security fence. 4,684,932, Cl. 340-564.000.

Kupler Corporation: *See—*
Smith, Philip L.; and Caprio, Joseph R., 4,684,196, Cl. 439-411.000.

Kuramochi, Koujiro: *See—*
Yokoyama, Fumitomo; Kuwayama, Yoshinari; Tatsuta, Mitsugu; and Kuramochi, Koujiro, 4,683,903, Cl. 137-56.000.

Kuramori, Ken: *See—*
Taketani, Toshinobu; Kuramori, Ken; Sakamoto, Sunji; and Fujii, Hiroshi, 4,683,651, Cl. 29-786.000.

Kuramoto, Kikuzo: *See—*
Ono, Tatsuo; Masuda, Akira; and Kuramoto, Kikuzo, 4,684,034, Cl. 220-6.000.

Kuraray Co., Ltd.: *See—*
Satoh, Kenji; Kaneshige, Isao; and Ikari, Kyoichiro, 4,684,564, Cl. 428-216.000.
Yamamoto, Fumio; Suzuki, Takayoshi; Ikari, Masahiro; Saito, Susumu; Ohmori, Akira; and Yasuhara, Takashi, 4,684,705, Cl. 526-246.000.

Kurecka, Donald J.: *See—*
Westercamp, Kenneth L.; Kurecka, Donald J.; and Yeack, David C., 4,683,971, Cl. 180-79.100.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Osugi, Katsuhisa; Ichinose, Isao; Takahashi, Eisaku; and Arahira, Masato, 4,684,664, Cl. 514-475.000.

Kureth, Jean-Bernard: *See—*
Heyraud, Marc A.; and Kureth, Jean-Bernard, 4,684,860, Cl. 318-696.000.

Kurisu, Takumi: *See—*
Hanazono, Masanobu; Hara, Shinichi; Akiyama, Hirosi; Hayashi, Masaaki; Saitoo, Harunobu; and Kurisu, Takumi, 4,685,014, Cl. 360-126.000.

Kurita, Toshiyuki: *See—*
Nakagaki, Nobuhumi; Murata, Toshinori; and Kurita, Toshiyuki, 4,684,985, Cl. 358-140.000.

Kurkela, Kauko O. A.: *See—*
Karjalainen, Arto J.; and Kurkela, Kauko O. A., 4,684,659, Cl. 514-396.000.

Kuroda, Michio: *See—*
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.

Kurosawa, Yoshiaki: *See—*
Ooi, Katsunori; Hidai, Yutaka; Kurosawa, Yoshiaki; and Nakamura, Yoshikatsu, 4,685,142, Cl. 382-13.000.

Kurtti, Gary R.; Ches, Gregory S.; Brender, David T.; and Senopole, John J., to General Motors Corporation. Inertia release for belt retractor winding prevention mechanism. 4,684,077, Cl. 242-107.600.

Kusakabe, Yukio: *See—*
Arai, Takeo; Anno, Nobuo; Kinoshita, Yusuke; and Kusakabe, Yukio, 4,683,844, Cl. 123-41.740.

Kuwayama, Yoshinari: *See—*
Yokoyama, Fumitomo; Kuwayama, Yoshinari; Tatsuta, Mitsugu; and Kuramochi, Koujiro, 4,683,903, Cl. 137-56.000.

Kuzuya, Tetsuro: *See—*
Sogo, Yoshitaka; Fukushima, Masami; and Kuzuya, Tetsuro, 4,683,771, Cl. 74-467.000.

Kwok, Kui-Chiu, to Graco Inc. Centrifugal atomizer. 4,684,064, Cl. 239-223.000.

Kyburz, Emilio: *See—*
Imhof, Rene; and Kyburz, Emilio, 4,684,731, Cl. 546-138.000.

Kypreos-Pantazis, Georg. Internal combustion engine having rotating pistons. 4,683,852, Cl. 123-230.000.

L. & C. Steinmuller GmbH: *See—*
Keintzel, Gunter; and Westebbe, Klaus, 4,683,842, Cl. 122-483.000.

LaBrosse, Paul R.; and Pohl, Daniel P., to Minnesota Mining & Manufacturing Company. Prefabricated bow form for a pom bow. 4,684,552, Cl. 428-4.000.

Labsystems Oy: *See—*
Kukka, Aarre; Tervamaki, Jukka; Nikulin, Heikki; and Vuorinen, Olavi, 4,684,250, Cl. 356-246.000.

Lacey, Derick A.: *See—*
Dickson-Wright, Edward A.; and Lacey, Derick A., 4,684,311, Cl. 414-535.000.

Lackner, John R.; and Bartasevich, William E., Jr., to Scott & Fetzer Company, The. Vacuum cleaner accessory bracket. 4,683,607, Cl. 15-323.000.

Lacoste, SA: *See—*
Roy, Jehan; and Dubois, Jean, 4,684,171, Cl. 297-47.000.

LaCount, Clifford E.: *See—*
Arney, Michel D.; and LaCount, Clifford E., 4,684,185, Cl. 439-502.000.

Ladd, Judith A.; and Vanderpool, Clarence D., to GTE Products Corporation. Chromium-cobalt fine alloy powder and process for producing same. 4,684,401, Cl. 75-0.5BA.

Lagin, Herbert. Medical pillow. 4,683,601, Cl. 5-431.000.

LaGrange, Nyle D.; Nielsen, Darryl M.; and Wheeler, Charles F., to Marley-Wylain Company, The. Vaned slinger for pumps. 4,684,331, Cl. 417-366.000.

Laimbock, Franz, to Yamaha. Multiple valve engine. 4,683,855, Cl. 123-432.000.

Laird, Jesse S. Endrotracheal tube holder. 4,683,882, Cl. 128-207.170.

Laliberte, Roger J. Liberty jig. 4,684,299, Cl. 408-115.00R.

Lam, Wilfred K., to C. F. Braun & Co. Process for recovering energy from an ethane-rich recycle stream. 4,684,759, Cl. 585-652.000.

Lamond, Lee T.; and Staton, Richard D., to Fichtel & Sachs Industries. Support column with gravity retention means. 4,684,098, Cl. 248-407.000.

Lamont, Patrick A., to C.C.L. South Africa (Proprietary) Limited. Hammer. 4,683,784, Cl. 81-22.000.

Landau, Ulrich: *See—*
Wacker, Erich; Landau, Ulrich; Sander, Wilfried; and Schellmann, Klaus, 4,683,808, Cl. 92-208.000.

Landrau, Felix A.: *See—*
Eckenhoff, James B.; Cortese, Richard; and Landrau, Felix A., 4,684,524, Cl. 424-469.000.

Landsiedel, Horst: *See—*
Plum, Hans; and Landsiedel, Horst, 4,684,663, Cl. 514-493.000.

Landstingens Inkopscentral, LIC ek. forening: *See—*
Palaghias, Georgios, 4,684,347, Cl. 433-228.100.

Lane, Martin, to De La Rue Systems Limited. Sheet feeding apparatus. 4,684,119, Cl. 271-4.000.

Lanese, Pasquale J.: *See—*
Furmanek, Robert A.; Mukherjee, Jyoti P.; and Lanese, Pasquale J., 4,684,266, Cl. 384-37.000.

Lange, Kenneth: *See—*
Malinowski, Leon; and Lange, Kenneth, 4,683,958, Cl. 172-705.000.

Langen, Manfred; Temburg, Konrad; and Teichmann, Paul, to Trutzschler GmbH & Co. KG. Apparatus for can changing. 4,683,619, Cl. 19-159.00A.

Langley, John D., to Kappler, Inc. Protective garment. 4,683,593, Cl. 2-82.000.

Langley, John G.: *See—*
Allen, Anthony P.; Forsmo, Sten; and Langley, John G., 4,684,549, Cl. 427-221.000.

Lantz, Ingvar. Muscle building apparatus. 4,684,125, Cl. 272-130.000.

Lanz, Martin: *See—*
Bednorz, Johannes G.; Denk, Winfried; Lanz, Martin; and Pohl, Wolfgang D., 4,684,206, Cl. 350-96.120.

Larrick, James W.; Ringold, Gordon M.; Mark, David F.; Lin, Leo S.; and Torti, Frank M., to Cetus Corporation, The Board of Trustees of the; and Leland Stanford Junior University. Use of tumor necrosis factor as a weight regulator. 4,684,623, Cl. 514-12.000.

Larsson, Bertil, to Flakt Aktiebolag. Suspended ceiling structure for rectangular filter elements. 4,683,699, Cl. 52-775.000.

Larsson, Hans, to ITT Industries, Inc. Method and apparatus for monitoring hydro turbine plants. 4,683,718, Cl. 60-327.000.

Laser Magnetic Storage International Company: *See—*
van der Put, Henk A., 4,685,097, Cl. 369-54.000.

Lash, Robert E.: *See—*
Hatfield, Gregory A.; and Lash, Robert E., 4,683,884, Cl. 128-303.140.

Laske, Gerd; and Valentin, Peter, to Braunschweigische Maschinenbauanstalt Aktiengesellschaft. Steam dryer for pressed fibrous material. 4,683,667, Cl. 34-203.000.

Latin Percussion, Inc.: *See—*
Moreschi, Giovanni, 4,684,091, Cl. 248-166.000.

Latshaw, Don. Triphonic sound system. 4,685,136, Cl. 381-108.000.

Lattion, Andre ; Carl, Alfred; and Oehler, Reinhard, to Maschinenfabrik Rieter AG. Arrangements for handling conical thread packages. 4,684,307, Cl. 414-31.000.

LaTulip, Randy J.: *See*—
Swearingen, Loren L.; Earls, Jimmy D.; and LaTulip, Randy J., 4,684,693, Cl. 524-600.000.

Laubach, William F.: *See*—
Jenkins, John W.; and Laubach, William F., 4,684,194, Cl. 439-260.000.

Lauson, David J.: *See*—
Chapman, Harry A.; and Lauson, David J., 4,684,885, Cl. 324-73.00R.

Lave, Daniel: *See*—
Fabre, Jean-Louis; Farge, Daniel; James, Claude; and Lave, Daniel, 4,684,658, Cl. 514-338.000.

Lavene, Bernard, to Electronic Concepts, Inc. Capacitor forming and manufacturing method. 4,685,026, Cl. 361-308.000.

Lawless, William N. Field dependent electrooptic device and method. 4,684,207, Cl. 350-96.140.

Lazar, Martin: *See*—
Edstrom, Carl W.; Fedele, Daniel E.; and Lazar, Martin, 4,684,277, Cl. 400-639.100.

Lazarev, Grigory B.: *See*—
Baraban, Viktor P.; Zabrovsky, Stanislav G.; Zvyagin, Albert F.; Lazarev, Grigory B.; and Tars, Yaak A., 4,685,045, Cl. 363-68.000.

Lazzari, Jean-Pierre, to Commissariat a l'Energie Atomique. Process for producing a coil for a magnetic recording head. 4,684,438, Cl. 156-649.000.

Le, Vinh Q.: *See*—
Norris, Richard G.; Webb, Monty F.; and Le, Vinh Q., 4,685,120, Cl. 379-26.000.

Leader, Raymond E.: *See*—
Smith, Dale K.; Donich, Thomas G.; Dickerson, Bobby V.; and Leader, Raymond E., 4,685,149, Cl. 455-56.000.

Lear Siegler, Inc.: *See*—
Stamper, James F., 4,684,076, Cl. 242-100.100.

Leaseburge, Emory J.; and Thomas, Thomas J., to Combustion Engineering, Inc. Supercritical fluid chromatograph with pneumatically controlled pump. 4,684,465, Cl. 210-198.200.

LeComber, Peter G.: *See*—
Owen, Alan E.; Sarrabayrouse, Gerard; LeComber, Peter G.; and Spear, Walter E., 4,684,972, Cl. 357-59.000.

Lee, Gim F., Jr.; and Olander, Walter K., to General Electric Company. Flow enhanced polyphenylene ether resin compositions. 4,684,681, Cl. 524-127.000.

Lee, Gim F., Jr., to General Electric Company. Flame retardant flexibilized polyphenylene ether compositions. 4,684,682, Cl. 524-141.000.

Lee, Hee W.: *See*—
Min, Seong K.; Kim, Yong J.; Lee, Hee W.; and Chun, Chul G., 4,685,009, Cl. 360-95.000.

Lee, Hsiao-Peng S.; Rawlinson, Stephen J.; and Si, Stephen S., to Amdahl Corporation. Two-stage pipelined execution unit and control stores. 4,685,058, Cl. 364-200.000.

Lee, Hsien-Che, to Eastman Kodak Company. Method for determining the color of a scene illuminant from a color image. 4,685,071, Cl. 364-526.000.

Lee, James K.: *See*—
Lelental, Mark; Lee, James K.; and VanKerkhove, Alan P., 4,684,602, Cl. 430-363.000.

Lee, Kiu-Seung: *See*—
Hodge, James D.; and Lee, Kiu-Seung, 4,684,409, Cl. 106-311.000.

Lee L. Woodard, Inc.: *See*—
Colby, Donald B., 4,684,170, Cl. 297-19.000.

Lee, Michaelina. Short-term fur security system. 4,683,730, Cl. 70-59.000.

Lee, Nancy M.: *See*—
Hosobuchi, Yoshio; Lee, Nancy M.; Loh, Horace H.; and Chang, Jaw-Kang, 4,684,624, Cl. 514-15.000.

Lee, Young E.; Downing, James H.; and Kaiser, Robert H., to Elkem Metals Company. Dephosphorization process for manganese-containing alloys. 4,684,403, Cl. 75-80.000.

Le Fur, Gerard R.: *See*—
Dubroeucq, Marie-Christine; Le Fur, Gerard R.; and Renault, Christian L. A., 4,684,652, Cl. 514-254.000.

Legoupil, Jean-Luc: *See*—
Damiron, Pierre M.; and Legoupil, Jean-Luc, 4,684,451, Cl. 204-141.500.

LeGrys, Scott R.: *See*—
Greco, Joseph A., II; Hawkins, Donald K.; LeGrys, Scott R.; and Kit Man, Wai, 4,685,068, Cl. 364-518.000.

Lehman, David B.: *See*—
Appelbaum, Matthew A.; Lehman, David B.; Nieglos, Donald J.; Nolte, Stanley C.; and Oehler, Michael P., 4,683,968, Cl. 380-4.000.

Lehman, John R.: *See*—
Butler, Ronald G.; Lehman, John R.; Gray, Douglas S.; and Houck, Wayne R., 4,683,906, Cl. 137-375.000.

Lehman, Lewis M., to Square D Company. Mounting apparatus for arc quenching plates for electric contacts. 4,684,772, Cl. 200-144.00R.

Leib, Tiberiu M.: *See*—
Derr, W. Rodman, Jr.; Garwood, William E.; Kuo, James C.; Leib, Tiberiu M.; Nace, Donald M.; and Tabak, Samuel A., 4,684,756, Cl. 585-330.000.

Leichnitz, Kurt, to Dragerwerk AG. Colorimetric indicator for the indication of the exhaustion of gas filters. 4,684,380, Cl. 55-274.000.

Leichtfried, Friedrich; Wuerthner, Hubert; and Himmetsberger, Alois, to TMC Corporation. Heel holder. 4,684,146, Cl. 280-626.000.

Leigh-Monstevens, Keith V., to Automotive Products plc. Concentric slave cylinder for motor vehicle clutch control mechanism. 4,684,003, Cl. 192-85.0CA.

Leir, Charles M., to Riker Laboratories, Inc. Process for the preparation of intermediates of derivatives of pyrrolidine and piperidine. 4,684,733, Cl. 546-337.000.

Leland Stanford Junior University, The Board of Trustees of the: *See*—
Kino, Gordon S.; Stearns, Richard G.; and Khuri-Yakub, Butrus T., 4,683,750, Cl. 73-606.000.
Larrick, James W.; Ringold, Gordon M.; Mark, David F.; Lin, Leo S.; and Torti, Frank M., 4,684,623, Cl. 514-12.000.
Shaw, Herbert J.; Youngquist, Robert C.; and Brooks, Janet L., 4,684,215, Cl. 350-96.290.

Lelental, Mark; Lee, James K.; and VanKerkhove, Alan P., to Eastman Kodak Company. Multicolor laser recording method and element. 4,684,602, Cl. 430-363.000.

Lemone, Lou; Faletra, Salvatore; McDaniel, John R.; and Caldara, Steve, to Data General Corporation. Memory mapping system. 4,685,057, Cl. 364-200.000.

Leon's Mfg. Co. Ltd.: *See*—
Malinowski, Leon; and Lange, Kenneth, 4,683,958, Cl. 172-705.000.

Leroy, Andre; and Flamme, Jean M., to Robert Bosch GmbH. Wiping arrangement for windows of vehicles. 4,683,605, Cl. 15-250.210.

Lessi, Jacques, to Institut Francais du Petrole. Process for hydraulically fracturing a geological formation along a predetermined direction. 4,683,950, Cl. 166-271.000.

Leung, Pak S.; and Matulewicz, William N., to First Brands Corporation. Organophosphate-containing antifreeze with buffer. 4,684,474, Cl. 252-75.000.

Leuschner, Horst, to Thomson Components-Mostek Corporation. Improved nonvolatile memory circuit using a dual node floating gate memory cell. 4,685,083, Cl. 365-185.000.

LeVeen, Eric G.: *See*—
LeVeen, Harry H.; LeVeen, Eric G.; and LeVeen, Robert F., 4,684,627, Cl. 514-25.000.

LeVeen, Harry H.; LeVeen, Eric G.; and LeVeen, Robert F. Treatment of cancer with phlorizin and its derivatives. 4,684,627, Cl. 514-25.000.

LeVeen, Robert F.: *See*—
LeVeen, Harry H.; LeVeen, Eric G.; and LeVeen, Robert F., 4,684,627, Cl. 514-25.000.

Lever Brothers Company: *See*—
Izzo, Henry J., 4,684,532, Cl. 426-533.000.

Lever, Robert J. A. B. Structural element for three dimensional objects, e.g. furniture. 4,684,282, Cl. 403-219.000.

Levine, Michael R., to Honeywell, Inc. Electronic thermostat with selectable mode to control heating only, cooling only or both heating and cooling. 4,683,939, Cl. 165-12.000.

Levitt, George, to Du Pont de Nemours, E. I., and Company. Agriculture sulfonamides. 4,684,395, Cl. 71-92.000.

Lewis, Adam J., Jr.: *See*—
Tew, Claude E.; and Lewis, Adam J., Jr., 4,684,812, Cl. 250-578.000.

Lewis, Conrad, to Mitel Corporation. Switching system loopback test circuit. 4,685,102, Cl. 370-15.000.

Lewis, John C., Jr., to Drackett Company, The. Handle socket adapter. 4,684,283, Cl. 403-299.000.

Lex Computing & Management Corporation: *See*—
Westland, William F., 4,685,003, Cl. 360-14.100.

Leyck, Sigurd: *See*—
Schulz, Volker; Leyck, Sigurd; Durr, Manfred; Ghyczy, Miklos; Wendel, Armin; and Hager, Jorg, 4,684,632, Cl. 514-78.000.

Leygue, Gilles: *See*—
Bossand, Bernard; Eppe, Jacques; Faure, Alain; and Leygue, Gilles, 4,684,391, Cl. 71-24.000.

Leynse, Kenneth J.: *See*—
Nichols, E. Lane, III; Hooper, William P.; and Leynse, Kenneth J., 4,685,022, Cl. 361-44.000.

LGZ Landis & Gyr Zug AG: *See*—
Antes, Gregor; Halder, Mathis; Fuchs, Paul; and Gehr, Peter, 4,685,138, Cl. 382-12.000.

Li, George S.: *See*—
Percec, Elena S.; and Li, George S., 4,684,376, Cl. 55-16.000.

Lichnofsky, Rudiger: *See*—
Cigdem, Saffet; Lichnofsky, Rudiger; and Martin, Harry, 4,683,998, Cl. 192-58.00C.

Lieber, Glen L.: *See*—
Ari, Suha V.; and Lieber, Glen L., 4,684,363, Cl. 604-98.000.

Liebert Corporation: *See*—
Powell, Jeffrey M., 4,684,875, Cl. 323-204.000.

Lieske, Edgar: *See*—
Konrad, Gunther; Maak, Norbert; and Lieske, Edgar, 4,684,371, Cl. 8-408.000.

Light, Gerard M.; Rocco, LeRoy E.; and Clancey, Stephen M., to Eaton Corporation. Fluid coupling device including manual engagement means. 4,683,999, Cl. 192-58.00B.

Liguore, Louis J.: *See*—
Beck, Lawrence R.; Kocjan, Andrew J.; Natoli, Richard A.; and Liguore, Louis J., 4,684,765, Cl. 174-68.500.

Lin, Kun-Shan; Goudie, Kathleen M.; and Frantz, Gene A., to Texas Instruments Incorporated. Text-to-speech synthesis system. 4,685,135, Cl. 381-52.000.

Lin, Leo S.: *See—*
Larrick, James W.; Ringold, Gordon M.; Mark, David F.; Lin, Leo S.; and Torti, Frank M., 4,684,623, Cl. 514-12.000.
Linco Holland Engineering B.V.: *See—*
Tieleman, Edward J., 4,683,616, Cl. 17-11.000.
Lindblom, Karl P. C.; and Engman, Sonja A., to Scanoptics Oy. Apparatus for carrying out spectral analysis. 4,684,253, Cl. 356-333.000.
Linder, Heinz, to Grapha-Holding AG. Method and apparatus for wrapping printed sheets. 4,683,708, Cl. 53-540.000.
Lindstrom, Michael J.: *See—*
DoMinh, Thap; Fleming, James C.; and Lindstrom, Michael J., 4,684,599, Cl. 430-270.000.
Lingenfelter, Thomas A.: *See—*
Hansen, Harmon R.; and Lingenfelter, Thomas A., 4,683,881, Cl. 128-204.260.
Lingnau, Juergen: *See—*
Schmitt, Klaus; Schoen, Klaus-Peter; Riedel, Peter; Lingnau, Juergen; and Pliefke, Engelbert, 4,684,594, Cl. 430-49.000.
Link, Helmut F., to Index-Werke Komm.-Ges. Han & Tessky. Method of machining a workpiece in a turret lathe and an nc lathe for performing this method. 4,683,787, Cl. 82-18.000.
Linke, Kaljo; and Neale, Raymond B., to N. B. Love Industries Pty. Limited. Apparatus for applying a mixed combination of adhesive and resin to corrugated board. 4,683,837, Cl. 118-612.000.
Lipp, Alfred; Reinmuth, Klaus; and von Struensee, Detlef, to Elektroschmelzwerk Kempten GmbH. Ceramic bonded neutron absorber plates of boron carbide and free carbon. 4,684,480, Cl. 252-478.000.
Lipton, Michael F.: *See—*
Tiffany, Burris D.; Nichols, Steve; Meulman, Paul A.; Hylton, Thomas A.; and Lipton, Michael F., 4,684,725, Cl. 540-565.000.
Littau, Eugene G. Dimensionally-adjustable straddle-type crop-working vehicle. 4,683,969, Cl. 180-6.480.
Little, Percy A.: *See—*
Walton, Paul G.; and Little, Percy A., 4,683,965, Cl. 175-385.000.
Little, Thomas N.; Longo, Lorenzo L.; and Chan, Sun-Shiu D., to Northern Telecom Limited. Analog circuit improvement in a digital integrated circuit technology. 4,684,832, Cl. 307-520.000.
Liu, Jia-ming: *See—*
Seymour, Robert J.; Liu, Jia-ming; and Chen, Ying C., 4,685,108, Cl. 372-19.000.
Liu, Thomas C.: *See—*
Hsia, Richard Y.; and Liu, Thomas C., 4,685,123, Cl. 379-93.000.
Liu, Yaguang. Pharmaceutical composition containing pure San-Mai-Sen. 4,684,628, Cl. 514-26.000.
LLC Corporation: *See—*
Craig, Clark E., 4,684,178, Cl. 312-221.000.
Llewellyn, Ian P.: *See—*
Heinecke, Rudolf A. H.; Ojha, Suresh M.; and Llewellyn, Ian P., 4,684,535, Cl. 427-38.000.
Llopis, Miguel C. Optical excitation electromagnetic motor. 4,684,857, Cl. 318-313.000.
Locastro, Joseph L.: *See—*
Desmond, James L.; and Locastro, Joseph L., 4,684,122, Cl. 272-119.000.
Locher, Hermann, to Giroflex Entwicklungs AG. Chair with rearwardly inclinable seat and back rest carrier. 4,684,173, Cl. 297-300.000.
Lockheed Corporation: *See—*
Cronin, Michael J., 4,684,081, Cl. 244-58.000.
Loctite Corporation: *See—*
Klemarczyk, Philip T., 4,684,538, Cl. 427-54.100.
Loewe, Richard; and Perthus, Peter, to Robert Bosch GmbH. Headlight for antidazzle lights of motor vehicles. 4,685,036, Cl. 362-61.000.
Loggy, Albert D. Modular reinforced building structure and method. 4,683,689, Cl. 52-80.000.
Loh, Horace H.: *See—*
Hosobuchi, Yoshio; Lee, Nancy M.; Loh, Horace H.; and Chang, Jaw-Kang, 4,684,624, Cl. 514-15.000.
Lojovich, Obrey. Manicure file and method of making same. 4,683,898, Cl. 132-76.400.
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., to Union Carbide Corporation. Titanium-aluminum-phosphorus-silicon-oxide molecular sieves. 4,684,617, Cl. 502-214.000.
Lok, Brent M. T.: *See—*
Gortsema, Frank P.; and Lok, Brent M. T., 4,684,511, Cl. 423-305.000.
Long, Maurice W. Methods of and circuits for suppressing doppler radar clutter. 4,684,950, Cl. 342-94.000.
Long, William B.; Over, Gary L.; Shaffer, Howard R.; and Shuey, John R., to AMP Incorporated. Breakaway electrical connector. 4,684,192, Cl. 439-374.000.
Longo, Lorenzo L.: *See—*
Little, Thomas N.; Longo, Lorenzo L.; and Chan, Sun-Shiu D., 4,684,832, Cl. 307-520.000.
Loo, Johnson, to International Computers Limited. Data processing apparatus having binary multiplication capability. 4,685,077, Cl. 364-759.000.
Loontjens, Jacobus A.: *See—*
de Koning, Adrianus J.; Loontjens, Jacobus A.; Mostert, Hubertus A. M.; and Omloo, Hubertus A. A., 4,684,706, Cl. 526-262.000.
Lopez, Gilbert T., to Cencorp. Method and apparatus for separating printed circuit boards from multi-board panels. 4,683,789, Cl. 83-35.000.
Loris, J. Articulate rafter framing jig and method of using same. 4,683,633, Cl. 29-407.000.
Lou, Gene W., to Du Pont de Nemours, E. I., and Company. Vapor-permeable liquid-impermeable fabric. 4,684,568, Cl. 428-265.000.
Lowe, Anthony C.: *See—*
Cox, Allen R.; Lowe, Anthony C.; and Wood, John C., 4,684,219, Cl. 350-343.000.
LTH Associates (c/o Blaxley-Maddox): *See—*
Tamminen, Pentti J., 4,684,585, Cl. 429-69.000.
Lu, Chung H.: *See—*
Acampora, Alfonse; and Lu, Chung H., 4,684,983, Cl. 358-135.000.
Lubowitz, Hyman R.; and Sheppard, Clyde H., to Boeing Company, The. Method for making polyimide oligomers. 4,684,714, Cl. 528-353.000.
Lucas Electrical Electronics and Systems Limited: *See—*
Cullingford, Christopher V.; Forrester, John S.; and Smith, Gerald B., 4,683,746, Cl. 73-118.100.
Lui, Chun K., to Westinghouse Electric Corp. Compliant inserts mounted in upper tie plate of BWR fuel assembly. 4,684,501, Cl. 376-446.000.
Luijten, Waltherus J. T. H.; and Moonen, Johannes J. E., to Ultra-Centrifuge Nederland N.V. High-vacuum molecular pump. 4,684,317, Cl. 415-73.000.
Luk Lamellen und Kupplungsbau GmbH: *See—*
Maucher, Edmund, 4,684,007, Cl. 192-106.200.
Lull Engineering Company, Inc.: *See—*
Prokop, James A.; and Truehart, David C., 4,683,802, Cl. 91-516.000.
Lummus Crest Inc.: *See—*
Van Driesen, Roger P.; Adams, William R.; Caspers, John; Baldasarri, Mario; and Trimble, Harold, 4,684,456, Cl. 208-143.000.
Lund, Nora A.: *See—*
Martellock, Paul T.; Dougherty, John J.; and Lund, Nora A., 4,685,024, Cl. 361-93.000.
Lundberg, Anders: *See—*
Andersson, Lars; Glanvall, Rune; Ericson, Kjell; and Lundberg, Anders, 4,684,330, Cl. 417-360.000.
Lundberg, Robert D.: *See—*
Peiffer, Dennis G.; Lundberg, Robert D.; Sedillo, Lawrence; and Newlove, John C., 4,683,952, Cl. 166-293.000.
Lunden, Risto: *See—*
Ebeling, Olavi; and Lunden, Risto, 4,683,685, Cl. 52-12.000.
Lundquist, Roy D. Seating unit and ganging connector for releasably interconnecting a plurality of individual furniture units such as chairs. 4,684,172, Cl. 297-248.000.
Lupo, Elio, to Gilardini S.p.A. Sun roof for vehicles. 4,684,168, Cl. 296-217.000.
Lussier, Barbara B., to Eastman Kodak Company. Non-precipitating quinone diazide polymer containing photoresist composition with o-quinone diazide trisester as dissolution inhibitor. 4,684,597, Cl. 430-190.000.
Luth, Royse I., to Weatherford/Lamb, Inc. Pipe handling apparatus. 4,684,314, Cl. 414-745.000.
Lutz, Alfons: *See—*
Igel, Richard; and Lutz, Alfons, 4,684,169, Cl. 296-221.000.
Lutzke, Anthony: *See—*
Meives, Otis E.; and Lutzke, Anthony, 4,683,705, Cl. 53-462.000.
Lutzke, Anthony J.: *See—*
Vorachek, Michael J.; Entringer, Guy P.; Meives, Otis E.; Lynch, Gary L.; and Lutzke, Anthony J., 4,683,704, Cl. 53-461.000.
Luzzi, Glenn J.; and Kominiak, Andrew A., to Amerace Corporation. High voltage cable splice protector. 4,684,764, Cl. 174-91.000.
Lynch, Gary L.: *See—*
Vorachek, Michael J.; Entringer, Guy P.; Meives, Otis E.; Lynch, Gary L.; and Lutzke, Anthony J., 4,683,704, Cl. 53-461.000.
Ma, John; and Weiss, Steven, to Capetronic (BSR) Ltd. Motor pulse extraction system. 4,684,858, Cl. 318-317.000.
Maak, Norbert: *See—*
Konrad, Gunther; Maak, Norbert; and Lieske, Edgar, 4,684,371, Cl. 8-408.000.
Maby, Jacques; and Maby, Jean L. Versatile carrying bar for cars with and without gutters. 4,684,049, Cl. 224-329.000.
Maby, Jean L.: *See—*
Maby, Jacques; and Maby, Jean L., 4,684,049, Cl. 224-329.000.
Macemon, Herbert J.; Schlake, Randall L.; Fisher, John L.; Piatt, Clair E.; and Mohney, Hubert L. R., to Kuhlman Corporation. Apparatus and method for fabricating a high voltage winding for a toroidal transformer. 4,683,919, Cl. 140-92.200.
Machida, Shoichi: *See—*
Tanabe, Hisao; Takahashi, Masaru; Ozawa, Hiroyasu; Machida, Shoichi; and Kitamura, Makoto, 4,683,993, Cl. 188-321.110.
Mackay, Harold A.: *See—*
Ostenak, Carl A.; and Mackay, Harold A., 4,684,217, Cl. 350-319.000.
MacLaurin, Blair K.: *See—*
Este, Grantley O.; Suthers, Mark S.; Streater, Richard W.; and MacLaurin, Blair K., 4,684,841, Cl. 310-313.00B.
Maeda, Tadayuki: *See—*
Okamura, Kazuo; Koyama, Satoshi; Maeda, Tadayuki; and Kamihigoshi, Tutomu, 4,684,591, Cl. 429-218.000.
Maeder, Rene; and Herzog, Albin, to Gamper & Co. AG. Method and apparatus for producing baling wire for tying together bundled items. 4,683,918, Cl. 140-73.000.
Maekawa, Motoi: *See—*
Matsushita, Tsuyoshi; Maekawa, Motoi; and Takahashi, Makoto, 4,684,275, Cl. 400-479.000.

Maesaka, Michinobu; Watanabe, Koichi; and Murata, Michihiro, to Murata Manufacturing Co., Ltd. Method of manufacturing an electrolytic double-layer capacitor. 4,683,639, Cl. 29-570.100.

Magalhaes, Frank M.: *See*—
Bowman, Wayne C.; Magalhaes, Frank M.; Suiter, Weyman B.; and Ziesse, Norman G., 4,685,041, Cl. 363-40.000.

Magnuson, Roy H.: *See*—
Fey, Edmond O.; Haselbauer, Peter; Jung, Dae Y.; Kaschak, Ronald A.; Kilthau, Hans-Dieter; Magnuson, Roy H.; and Wagner, Robert J., 4,684,545, Cl. 427-98.000.

Magrobi, Brian, to Genis, Johan C. Vehicle security devices. 4,683,735, Cl. 70-168.000.

Maher, Thomas F.: *See*—
Eves, E. Eugene, II; and Maher, Thomas F., 4,684,777, Cl. 219-10.55A.

Maier, Gerhard, to Deutsche Thomson-Brandt GmbH. Tuning of a resonant circuit in a communications receiver. 4,685,150, Cl. 455-183.000.

Majkowski, Richard F.: *See*—
Shu-Ti Lee, Peter; Majkowski, Richard F.; and Partin, Dale L., 4,684,805, Cl. 250-343.000.

Makiguchi, Kyoko; Sagusa, Hisayuki; and Nomura, Yasushi, to Hitachi, Ltd. Automated analyzing apparatus. 4,684,252, Cl. 356-328.000.

Malabarba, Adriano; and Cavalleri, Bruno, to Gruppo Lepetit S.p.A. Basic monocarboxyamide derivatives of actagardine having antibiotic activity and compositions thereof. 4,684,644, Cl. 514-210.000.

Malaney, Frank E., to Chicopee. Microfine fiber laminate. 4,684,570, Cl. 428-296.000.

Malinowski, Leon; and Lange, Kenneth, to Leon's Mfg. Co. Ltd. Cultivator shank. 4,683,958, Cl. 172-705.000.

Mally, Timothy G.: *See*—
Jonovic, John A.; Stengel, Bruce W.; and Mally, Timothy G., 4,684,040, Cl. 222-148.000.

Malzahn, Paul. Protective annular construction and method of manufacture. 4,683,691, Cl. 52-167.000.

Manchem Limited: *See*—
Tate, Philip E. R., 4,684,421, Cl. 156-124.000.

Manino, Pier Giuseppe: *See*—
Cantello, Maichi; and Manino, Pier Giuseppe, 4,684,780, Cl. 219-121.0LQ.

Mann, Joseph M.; and Spitler, James A., to Navistar International Corporation. Electrically heated fuel pick-up assembly for vehicle fuel tanks. 4,684,786, Cl. 219-297.000.

Mannesmann Rexroth GmbH: *See*—
Wittich, Kurt, 4,683,909, Cl. 137-505.110.

Manninen, Markku; and Halme, Aarne, to Valtion Teknillinen Tutkimuskeskus. Method and apparatus for outlining the environment of a multiarticular duty machine by means of a laser pointer. 4,685,054, Cl. 364-191.000.

Manojlovic, Vladimir. Process for water purification, and a filter for carrying out the process. 4,684,471, Cl. 210-665.000.

Marach, David R.: *See*—
Miller, Robert A.; and Marach, David R., 4,685,028, Cl. 361-334.000.

Marathon Oil Company: *See*—
Sydansk, Robert D.; and Argabright, Perry A., 4,683,949, Cl. 166-270.000.

Marazzi, Donata: *See*—
Cadossi, Ruggero; and Marazzi, Donata, 4,683,873, Cl. 128-1.500.

Marcellin, Michel: *See*—
Morin, Jean-Xavier; and Marcellin, Michel, 4,684,375, Cl. 48-197.00R.

Marchant, Robert L.: *See*—
Dalebout, William T.; Vassoughi, Sohrab; Martinell, William J.; Rohrer, David C.; Martinell, Steven W.; and Marchant, Robert L., 4,684,126, Cl. 272-134.000.

Marchionni, Giuseppe; Tonelli, Claudio; and Nicoletti, Alberto, to Ausimont S.p.A. Process for the fluorination in liquid phase of unsaturated compounds. 4,684,452, Cl. 204-157.940.

Marcus, Bonita K.: *See*—
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,684,617, Cl. 502-214.000.

Marcus, Edward J. Device for retarding oxidation of partly consumed bottle of wine. 4,684,033, Cl. 215-269.000.

Margolin, Mark; Moore, James E.; and Grois, Igor, to Allied Corporation. Fiber optic connector with compensating mechanism. 4,684,205, Cl. 350-96.210.

Marin, Manuel. Door lock. 4,683,733, Cl. 70-134.000.

Marissal, Jeanine; and Aubert, Lucien P., to Societe Anonyme dite: BIOTHERM. Slenderizing and anti-cellulitis cosmetic composition based on an extract of a plant containing saponins, an extract of Arnica Montana L and a kola nut extract, and to a process for using the same. 4,684,522, Cl. 424-195.100.

Mark, David F.: *See*—
Larrick, James W.; Ringold, Gordon M.; Mark, David F.; Lin, Leo S.; and Torti, Frank M., 4,684,623, Cl. 514-12.000.

Marker, Richard L.: *See*—
Miller, Gary T.; Marker, Richard L.; and Marker, Ronald E., 4,683,803, Cl. 92-71.000.

Marker, Ronald E.: *See*—
Miller, Gary T.; Marker, Richard L.; and Marker, Ronald E., 4,683,803, Cl. 92-71.000.

Marley-Wylain Company, The: *See*—
LaGrange, Nyle D.; Nielsen, Darryl M.; and Wheeler, Charles F., 4,684,331, Cl. 417-366.000.

Maroth, Sybil. Swing force indicator for a playing piece of sports equipment. 4,684,133, Cl. 273-186.00A.

Marotta, Enrico; and Castronuovo, Lucia. Quinoxaline derivatives useful for treatment and prophylaxis of swine dysentery and as animal growth promotants. 4,684,649, Cl. 514-249.000.

Marquardt, Kurt, to Hager & Elsasser GmbH. Apparatus for washing material. 4,684,464, Cl. 210-189.000.

Marraccini, Antonio; Carlini, Filippo M.; Pasquale, Antonio; and Pontevivo, Michele, to Montedison S.p.A. Silanated quinacridone dyes and composite pigments. 4,684,408, Cl. 106-300.000.

Marrs, Thomas C.: *See*—
Kiltie, Ordean; and Marrs, Thomas C., 4,684,912, Cl. 336-185.000.

Marshall Electric Corporation: *See*—
Kiltie, Ordean; and Marrs, Thomas C., 4,684,912, Cl. 336-185.000.

Martellock, Paul T.; Dougherty, John J.; and Lund, Nora A., to General Electric Company. Overcurrent circuit interrupter using RMS sampling. 4,685,024, Cl. 361-93.000.

Martin, Harry: *See*—
Cigdem, Saffet; Lichnofsky, Rudiger; and Martin, Harry, 4,683,998, Cl. 192-58.00C.

Martin, Howard. Endodontic access bur with extended diamond coat and method for using. 4,684,346, Cl. 433-166.000.

Martin, Richard L., to Hemex Scientific, Inc. Two-piece heart valve holder/rotator. 4,683,883, Cl. 128-303.00R.

Martin, William A., to Eastman Kodak Company. Method for retrieving unedited video still pictures. 4,685,001, Cl. 358-342.000.

Martinak, Bonifac. Man made floating island. 4,683,719, Cl. 60-398.000.

Martinell, Steven W.: *See*—
Dalebout, William T.; Vassoughi, Sohrab; Martinell, William J.; Rohrer, David C.; Martinell, Steven W.; and Marchant, Robert L., 4,684,126, Cl. 272-134.000.

Martinell, William J.: *See*—
Dalebout, William T.; Vassoughi, Sohrab; Martinell, William J.; Rohrer, David C.; Martinell, Steven W.; and Marchant, Robert L., 4,684,126, Cl. 272-134.000.

Maruno, Naohiko; Abe, Masakazu; and Ogawa, Tetsuo, to Nagano Keiki Seisakusho, Ltd. Gas pressure transducer. 4,684,842, Cl. 310-316.000.

Maruta, Rikio, to NEC Corporation. Method and apparatus for converting an analog signal to a digital signal using an oversampling technique. 4,684,925, Cl. 340-347.0AD.

Masas, Fernando. Powder actuated fastening system and fastener assembly for use therewith. 4,684,050, Cl. 227-10.000.

Mascellani, Giuseppe; Fravolini, Arnaldo; and Terni, Patrizia, to Mediolanum Farmaceutici S.R.L. Anti-bacterial pyrido-benzothiazine derivative and pharmaceutical composition therefor. 4,684,647, Cl. 514-222.000.

Maschinenfabrik Gehring Gesellschaft mit beschrankter Haftung & Co. Kommanditgesellschaft: *See*—
Bender, Albert, 4,683,680, Cl. 51-34.00J.

Maschinenfabrik Heid Aktiengesellschaft: *See*—
Steiner, Karl, 4,683,626, Cl. 29-40.000.

Maschinenfabrik Rieter AG: *See*—
Lattion, Andre ; Carl, Alfred; and Oehler, Reinhard, 4,684,307, Cl. 414-31.000.

Maskasky, Joe E., to Eastman Kodak Company. Tabular silver halide emulsions with ledges. 4,684,607, Cl. 430-567.000.

Massit, Claude; Nicolas, Gerard; and Turc, Gerard, to Commissariat a l'Energie Atomique. Microconnector with a high density of contacts. 4,684,181, Cl. 439-59.000.

Mastukura, Motoo: *See*—
Higuchi, Takayoshi; Tanahashi, Mitsuhiko; and Mastukura, Motoo, 4,684,740, Cl. 549-464.000.

Masuda, Akira: *See*—
Ono, Tatsuo; Masuda, Akira; and Kuramoto, Kikuzo, 4,684,034, Cl. 220-6.000.

Masuda, Toshiro; Ishizuka, Kouichi; Fujita, Toshiji; and Kinoshita, Yoshio, to Toppan Printing Co., Ltd.; and Mitsubishi Jukogyo Kabushiki Kaisha. Inspecting device for print. 4,685,139, Cl. 382-1.000.

Masumoto, Hakaru; Sawaya, Showhachi; and Hinai, Masakatsu, to Foundation: The Research Institute of Electric and Magnetic Alloys, The. High damping capacity alloy and a process for producing the same. 4,684,414, Cl. 148-11.50R.

Masumoto, Hakaru; and Nakamura, Naoji, to Foundation: The Research Institute of Electric and Magnetic Alloys, The. Alloy with small change of electric resistance over wide temperature range and method of producing the same. 4,684,416, Cl. 148-430.000.

Matias, Jonathan R.: *See*—
Orentreich, Norman; and Matias, Jonathan R., 4,684,635, Cl. 514-170.000.

Matsubara, Sumiyuki: *See*—
Okamoto, Tadashi; Matsubara, Sumiyuki; and Handa, Masahisa, 4,684,567, Cl. 428-257.000.

Matsuda, Terumi; and Tamura, Kaoru, to Fuji Photo Film Co., Ltd. Stimulable phosphor sheet. 4,684,592, Cl. 430-6.000.

Matsui, Isamu; Kimura, Hidetoshi; and Nakanishi, Kazuo, to Murata Kikai Kabushiki Kaisha. Bobbin feeding system. 4,683,713, Cl. 57-281.000.

Matsumiya, Sadayuki: *See*—
Hanaoka, Hiroshi; and Matsumiya, Sadayuki, 4,684,257, Cl. 356-374.000.

Matsumoto, Hiroshi: *See*—
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,684,397, Cl. 71-96.000.

Matsumoto, Kazuya: *See*—
Nakamura, Tsutomu; and Matsumoto, Kazuya, 4,684,992, Cl. 358-213.120.

Matsumoto, Takeshi, to Yamato Mishin Seizo Kabushiki Kaisha. Ornamental thread automatic cutting device of flat plural-needles sewing machine. 4,683,828, Cl. 112-294.000.

Matsunaga, Hiroshi; Shimojima, Yoji; Tokunaga, Ichiro; and Obata, Kosei, to Alps Electric Co., Ltd. Light transmission device. 4,684,210, Cl. 350-96.200.

Matsunaga, Koji; and Hatada, Kenzo, to Matsushita Electric Industrial Co. Ltd. Electrode connection structure of flat device. 4,684,974, Cl. 357-68.000.

Matsuo, Michiko, legal representative: *See*—
Ochiai, Michihiko; Kishimoto, Shoji; and Matsuo, Taisuke, deceased, 4,684,724, Cl. 540-355.000.

Matsuo, Taisuke, deceased: *See*—
Ochiai, Michihiko; Kishimoto, Shoji; and Matsuo, Taisuke, deceased, 4,684,724, Cl. 540-355.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Imai, Akihiro; Shimizu, Tokihiko; and Taguchi, Nobuyoshi, 4,684,561, Cl. 428-141.000.
Matsunaga, Koji; and Hatada, Kenzo, 4,684,974, Cl. 357-68.000.
Miura, Masayoshi; and Iwasawa, Toshiyuki, 4,684,957, Cl. 346-1.100.

Matsushita, Tsuyoshi; Maekawa, Motoi; and Takahashi, Makoto, to Tokyo Electric Co., Ltd. Electronic typewriter with presettable specification tables. 4,684,275, Cl. 400-479.000.

Matsuura, Masahiko; Doi, Nobuo; Yoshioka, Sadashichi; Okimoto, Haruo; and Ueda, Kazuhiko, to Mazda Motor Corporation. Engine roughness control means. 4,683,856, Cl. 123-436.000.

Matsuura, Yutaka; Sagawa, Masato; and Fujimura, Setsuo, to Sumitomo Special Metals Co., Ltd. Permanent magnet materials. 4,684,406, Cl. 75-244.000.

Matteuzzi, Claudio; and Matteuzzi, Emilio. Machine for automatically engraving the groove in tire treads. 4,683,931, Cl. 157-13.000.

Matteuzzi, Emilio: *See*—
Matteuzzi, Claudio; and Matteuzzi, Emilio, 4,683,931, Cl. 157-13.000.

Matthews Studio Electronics: *See*—
Nettmann, Ernst F., 4,683,770, Cl. 74-425.000.

Matthews, Thomas R.: *See*—
Eppstein, Deborah A.; Fraser-Smith, Elizabeth; and Matthews, Thomas R., 4,684,625, Cl. 514-19.000.

Matthias, Guenther: *See*—
Kraus, Friedrich; Matthias, Guenther; Wittmann, Otto; and Diem, Hans, 4,684,690, Cl. 524-419.000.

Matulewicz, William N., to First Brands Corporation. Organophosphate and silicate containing antifreeze. 4,684,475, Cl. 252-75.000.

Matulewicz, William N.: *See*—
Leung, Pak S.; and Matulewicz, William N., 4,684,474, Cl. 252-75.000.

Maucher, Edmund, to Luk Lamellen und Kupplungsbau GmbH. Clutch plate. 4,684,007, Cl. 192-106.200.

Maurer, Ghislain: *See*—
Michelet, Jacques; and Maurer, Ghislain, 4,685,112, Cl. 373-72.000.

Mavilor Systemes S.A.: *See*—
Casanova, Damien, 4,684,838, Cl. 310-93.000.

Maxi-Torque Drill Systems, Inc.: *See*—
Wenzel, Kenneth H., 4,683,964, Cl. 175-107.000.

Maxon Electronics Co. Ltd.: *See*—
White, Donald R.; and Harrison, Michael R., 4,685,099, Cl. 370-30.000.

Maxwell Laboratories, Inc.: *See*—
Valencia, Vance I., 4,684,820, Cl. 307-106.000.

May, Joe T.; and Hale, Steven D., to Electronic Instrumentation and Technology. Film area computer. 4,685,074, Cl. 364-564.000.

Mayer, Dieter: *See*—
Breitkreuz, Helmut; Clement, Albrecht; Mayer, Dieter; Ruppmann, Claus; Walz, Dieter; Wild, Ernst; and Zechnall, Martin, 4,683,861, Cl. 123-520.000.

Mayes, Ronald A., to Helena Laboratories. Fluid proportioning device. 4,683,911, Cl. 137-561.00A.

Mayo, William T., to North American Philips Corporation. Amplitude conditional signal processing for ultrasound frequency estimation. 4,683,893, Cl. 128-660.000.

Mayr, Ernst: *See*—
Goldmann, Horst; Mayr, Ernst; and Oestreich, Ulrich, 4,684,214, Cl. 350-96.230.

Mayrhofer, Max: *See*—
Fastner, Thorwald; Mayrhofer, Max; and Taschner, Walter, 4,684,053, Cl. 228-158.000.

Mazda Motor Corporation: *See*—
Matsuura, Masahiko; Doi, Nobuo; Yoshioka, Sadashichi; Okimoto, Haruo; and Ueda, Kazuhiko, 4,683,856, Cl. 123-436.000.
Taketani, Toshinobu; Kuramori, Ken; Sakamoto, Sunji; and Fujii, Hiroshi, 4,683,651, Cl. 29-786.000.

Maziarz, John D., to Capewell Components Company Limited Partnership. Parachute quick release coupling. 4,684,083, Cl. 244-151.00A.

Mazzorana, Alfred B. Starter with two motors. 4,684,816, Cl. 290-38.00R.

McBride, Julia K. Electric nail filing device. 4,683,897, Cl. 132-73.600.

McCubbrey, David; and Friedman, Theron, to Environmental Research Institute of Michigan. Image processing system with transformation detection. 4,685,144, Cl. 382-49.000.

McDaniel, John R.: *See*—
Lemone, Lou; Faletra, Salvatore; McDaniel, John R.; and Caldara, Steve, 4,685,057, Cl. 364-200.000.

McDonald, Allen S.; Philp, Charles W.; and Sperakis, Thomas A., to Handy & Harman. Method of brazing carbide using copper-zinc-manganese-nickel alloys. 4,684,052, Cl. 228-122.000.

McDonald, David B.: *See*—
Hoffman, Donald E.; and McDonald, David B., 4,683,913, Cl. 137-625.400.

McDonnell Douglas Corporation: *See*—
Hall, Edward A., 4,684,953, Cl. 343-725.000.

McGary, Charles W., Jr.: *See*—
Taller, Robert A.; and McGary, Charles W., Jr., 4,684,490, Cl. 264-296.000.

McGee, James N., Jr., to Burlington Industries, Inc. Reinforced V-belt containing fiber-loaded non-woven fabric and method for producing same. 4,684,569, Cl. 428-286.000.

McGourty, Lawrence F.: *See*—
McGourty, Thomas K.; and McGourty, Lawrence F., 4,683,820, Cl. 101-93.360.

McGourty, Thomas K.; and McGourty, Lawrence F., to Varitronic Systems, Inc. Printing mechanism. 4,683,820, Cl. 101-93.360.

McGregor, James E. A.: *See*—
Bigham, C. Bruce; Burton, Robert J.; and McGregor, James E. A., 4,684,180, Cl. 439-29.000.

McGroary, Francis X., to Allied Corporation. Radio frequency signal generator. 4,684,902, Cl. 331-38.000.

McKechnie, Malcolm T.; and Thompson, David G., to British Petroleum Company p.l.c., The. Method for desalting crude oil. 4,684,457, Cl. 208-188.000.

McNeilus Truck and Manufacturing, Inc.: *See*—
Christenson, Ronald E., 4,684,142, Cl. 280-81.00R.

MD Engineering: *See*—
Hatfield, Gregory A.; and Lash, Robert E., 4,683,884, Cl. 128-303.140.

Meco Corporation: *See*—
Bales, Emmett R.; and Huff, George L., 4,683,866, Cl. 126-25.00B.

Medical Engineering Corp.: *See*—
Carter, Garry L., 4,683,748, Cl. 73-226.000.

Mediolanum Farmaceutici S.R.L.: *See*—
Mascellani, Giuseppe; Fravolini, Arnaldo; and Terni, Patrizia, 4,684,647, Cl. 514-222.000.

Meditec Research Associates: *See*—
Schaffer, Irving; and Emmerich, Claude L., 4,684,367, Cl. 604-140.000.

Mehnert, Walter, to MITEC Moderne Industrietechnik GmbH. Inverter for generating a staircase-shaped a.c. voltage on each of the phase conductors of a multiphase system. 4,685,043, Cl. 363-43.000.

Mehta, Kamal N.: *See*—
Takiar, Hem P.; and Mehta, Kamal N., 4,684,975, Cl. 357-70.000.

Meinecke, Albrecht; Schmid, Hans-Rainer; and Egelhof, Dieter, to J.M. Voith GmbH. Sorter for paper pulp suspensions including a damping chamber. 4,684,444, Cl. 162-380.000.

Meishintoryo Co. Ltd.: *See*—
Adachi, Toshio, 4,684,673, Cl. 523-116.000.

Meisner, Alfred: *See*—
Arnold, Werner; Grasser, Hans; Kruger, Tilmann; and Meisner, Alfred, 4,684,261, Cl. 368-107.000.

Meister, Pierre-Andre , to Eta S.A. Fabriques d'Ebauches. Electronic timepiece with analog display comprising a seconds indicator member. 4,684,262, Cl. 368-157.000.

Meives, Otis E.; and Lutzke, Anthony, to PEMCO, Inc. Method and apparatus for confining wrapped reams of paper sheets in cardboard boxes. 4,683,705, Cl. 53-462.000.

Meives, Otis E.: *See*—
Vorachek, Michael J.; Entringer, Guy P.; Meives, Otis E.; Lynch, Gary L.; and Lutzke, Anthony J., 4,683,704, Cl. 53-461.000.

Meland, Ronald F.: *See*—
Berfield, Robert C.; and Meland, Ronald F., 4,683,608, Cl. 15-328.000.

Melton, Robert L.: *See*—
Nelsen, Christopher P.; and Melton, Robert L., 4,683,753, Cl. 73-655.000.

Memmola, Serafino, to Delta Elettronica s.r.l. Bowden cable. 4,683,774, Cl. 74-501.00R.

Mendoza, Abel, to Dow Chemical Company, The. Di-ortho-substituted di-meta-halogenated para-halomethylphenols. 4,684,752, Cl. 568-779.000.

Mercier, Roland F.: *See*—
Henderson, James A.; Travlos, Constantine M.; Ferris, David S.; Duddy, Gerald J.; and Mercier, Roland F., 4,683,636, Cl. 29-564.600.

Merck & Co., Inc.: *See*—
Chang, Raymond S. L.; and Parsons, William H., 4,684,645, Cl. 514-213.000.
Chang, Raymond S. L.; and Evans, Ben E., 4,684,646, Cl. 514-221.000.

Meredith, Michael D.; Bentvelzen, Joseph M.; and Jordan, Marvin F., to Weyerhaeuser Company. Oxygen reactor deaeration tank and system. 4,684,442, Cl. 162-242.000.

Meriwether, Jon D., to Follansbee Steel Corporation. Hinge connector for floating dock. 4,683,833, Cl. 114-267.000.

Mertz, Stanley A.: *See*—
Welsh, William A.; Parent, Yves O.; and Mertz, Stanley A., 4,684,530, Cl. 426-330.400.

Messerschmitt-Bolkow-Blohm Gesellscaft mit beschrankter Haftung: *See—*
Sodeikat, Dieter, 4,684,804, Cl. 250-338.000.
Metzeler Kautschuk GmbH: *See—*
Ghibu, Michael; Hartel, Volker; Heynemann, Carl; and Raubach, Manfred, 4,683,979, Cl. 181-286.000.
Metzner, Uwe: *See—*
Kupec, Peter; Metzner, Uwe; and Thilo, Peer, 4,684,932, Cl. 340-564.000.
Meulman, Paul A.: *See—*
Tiffany, Burris D.; Nichols, Steve; Meulman, Paul A.; Hylton, Thomas A.; and Lipton, Michael F., 4,684,725, Cl. 540-565.000.
Meyer, Bruno, to Valutec AG. Collapsible wheelchair and wheelchair structure. 4,684,149, Cl. 280-650.000.
Meyer, Hans R.: *See—*
Artz, Klaus; Meyer, Hans R.; Reinehr, Dieter; and Weber, Kurt, 4,684,744, Cl. 558-388.000.
Meyer, Karen M.: *See—*
Fornuto, Joseph; Gifford, William E.; and Meyer, Karen M., 4,683,862, Cl. 123-520.000.
Meyer, Rolf-Volker; Fahnler, Friedrich; Dhein, Rolf; and Michael, Dietrich, to Bayer Aktiengesellschaft. Activated anionic polymerization of lactams. 4,684,746, Cl. 564-38.000.
Meyerson, Bernard S.: *See—*
Jasinski, Joseph M.; Meyerson, Bernard S.; and Scott, Bruce A., 4,684,542, Cl. 437-245.000.
Micard, Guy, to Solex and Regie Nationale des Uines Renault. Electrically controlled valve with piezoelectric effect. 4,684,104, Cl. 251-129.050.
Michael, Dietrich: *See—*
Meyer, Rolf-Volker; Fahnler, Friedrich; Dhein, Rolf; and Michael, Dietrich, 4,684,746, Cl. 564-38.000.
Michaud, James A. Chuck for use in driving lag rods with a drill having a reversible motor. 4,684,138, Cl. 279-7.000.
Michel, Dominique: *See—*
Danguy des Deserts, Loic M. J.; Michel, Dominique; and Sedillot, Francois G., 4,684,292, Cl. 405-202.000.
Michelet, Jacques; and Maurer, Ghislain, to IRSID. Electrical connection device intended to be placed through the wall of an electrical direct-current metallurgical furnace. 4,685,112, Cl. 373-72.000.
Michl, Jurgen: *See—*
Kersten, Gunther; Klauss, Walter; and Michl, Jurgen, 4,683,786, Cl. 82-2.00B.
Miclot, Andre L., to Automobiles Peugeot; and Automobiles Citroen. Device for retaining a door in open position. 4,684,158, Cl. 292-76.000.
Miki, Yasuhiro, to Brother Kogyo Kabushiki Kaisha. Apparatus for printing with character fonts and dot-matrix printing in the same line. 4,684,269, Cl. 400-82.000.
Mikoshiba, Hitoshi, to Seiko Epson Kabushiki Kaisha. Compact printer with hammer structure within type drum. 4,683,819, Cl. 101-93.220.
Miles Laboratories, Inc.: *See—*
Dove, George B.; and Mitra, Gautam, 4,684,723, Cl. 530-351.000.
Milius, John W.; and Alderson, Jill D., to Mine Safety Appliances Company. Electroless copper plating and bath therefor. 4,684,550, Cl. 427-437.000.
Miller, Arthur O.; Coleman, Hollis; Atkinson, Roger; and Dorsey, Boyd, to Southwestern Bell Telephone. System for converting a No. 5 crossbar telephone switching central office to a conforming equal access central office. 4,685,127, Cl. 379-221.000.
Miller, Gary T., to General Motors Corporation. Variable displacement wobble plate compressor guide rod mounting arrangement. 4,683,765, Cl. 74-60.000.
Miller, Gary T.; Marker, Richard L.; and Marker, Ronald E., to General Motors Corporation. Swash plate compressor having integral shoe and ball. 4,683,803, Cl. 92-71.000.
Miller, Larry D., to General Motors Corporation. Easy access seat belt system. 4,684,153, Cl. 280-808.000.
Miller, Larry J.; Rattlingourd, Glen D.; and Johnson, Clifford T., to Sperry Corporation. High rate multiplexer. 4,685,106, Cl. 370-112.000.
Miller, Mark A.: *See—*
Chung, Jing-Yau; Chen, Sen-Tsuen; Wainerdi, James C.; and Miller, Mark A., 4,685,091, Cl. 367-31.000.
Miller, Michael F.: *See—*
Carlson, Lee R.; Hegedus, Denes A.; Jarrett, Steven M.; Miller, Michael F.; Riley, Martin E.; and Wright, David L., 4,685,109, Cl. 372-61.000.
Miller, Ralph A.; and Whitney, Harry B., to Garrett Corporation, The. Inflatable evacuation device. 4,684,079, Cl. 244-137.200.
Miller, Robert A.; and Marach, David R., to Allied Corporation. A.C. power entry module. 4,685,028, Cl. 361-334.000.
Miller, Timothy J. E.; Plunkett, Allan B.; and Steigerwald, Robert L., to General Electric Company. Regenerative unipolar converter for switched reluctance motors using one main switching device per phase. 4,684,867, Cl. 318-701.000.
Miller, William G., to Xerox Corporation. Document scanning drum and flash exposure copier. 4,684,240, Cl. 355-14.00R.
Miller, William H.: *See—*
Richard, Thomas J.; and Miller, William H., 4,684,483, Cl. 260-502.50F.
Min, Seong K.; Kim, Yong J.; Lee, Hee W.; and Chun, Chul G., to Samsung Electronics Co., Ltd. Cassette loading apparatus for video cassette recorder. 4,685,009, Cl. 360-95.000.
Minasy, Arthur J.; and Pokalsky, Peter A., to Knogo Corporation. Method and apparatus for deactivating targets used in electromagnetic type article surveillance systems. 4,684,930, Cl. 340-551.000.
Mine Safety Appliances Company: *See—*
Milius, John W.; and Alderson, Jill D., 4,684,550, Cl. 427-437.000.
Minegishi, Kazushige: *See—*
Nakajima, Shigeru; Minegishi, Kazushige; Miura, Kenji; Morie, Takashi; and Somatani, Toshifumi, 4,683,643, Cl. 437-203.000.
Minematsu, Yoshihiko; Tanaka, Minoru; Yamamoto, Masayuki; and Sakamoto, Kenichiro, to Mitsubishi Denki Kabushiki Kaisha. Wrist device of industrial robot. 4,684,313, Cl. 414-735.000.
Minnesota Mining and Manufacturing Company: *See—*
Ersfeld, Dean A.; Sandvig, Timothy C.; and Gobran, Diane S., 4,683,877, Cl. 128-90.000.
Gardner, Richard N., 4,684,454, Cl. 204-192.200.
LaBrosse, Paul R.; and Pohl, Daniel P., 4,684,552, Cl. 428-4.000.
Ou-Yang, David T., 4,684,554, Cl. 428-35.000.
Schultz, William J.; Portelli, Gene B.; and Tane, Jeffrey P., 4,684,678, Cl. 523-466.000.
Minnesota Valley Engineering, Inc.: *See—*
Neeser, Timothy A., 4,683,921, Cl. 141-1.000.
Minogue, Paschal, to Analog Devices, Inc. Temporal averaging using a voltage mode D/A converter. 4,684,922, Cl. 340-347.0DA.
Minor, James C., to Eastman Kodak Company. Optional output for test patches. 4,684,243, Cl. 355-14.0SH.
Minten, Karl L.; and Pismennaya, Galina, to Olin Hunt Specialty Products, Inc. Printed wiring board having carbon black-coated through holes. 4,684,560, Cl. 428-131.000.
Mintz, John D.: *See—*
Kortschinski, Juri; Mintz, John D.; and Filter, Reinhard, 4,685,021, Cl. 361-42.000.
Mirviss, Stanley B., to Stauffer Chemical Company. Promotion of raney nickel hydrogenation catalyst. 4,684,735, Cl. 548-308.000.
Misic, George J., to Picker International, Inc. Interface system for NMR spectrometer and quadrature probe. 4,684,895, Cl. 324-322.000.
Misiura, Konrad: *See—*
Stec, Wojciech; Kinas, Ryszard; and Misiura, Konrad, 4,684,742, Cl. 558-81.000.
Misra, Sudhan S.: *See—*
Brecht, William B.; and Misra, Sudhan S., 4,683,647, Cl. 29-623.200.
Mistry, Keku M.: *See—*
Steigerwald, Robert L.; and Mistry, Keku M., 4,685,040, Cl. 363-17.000.
Misumi, Masao, to Oval Engineering Co., Ltd. Vortex flow meter. 4,683,760, Cl. 73-861.220.
Mitchell, Robert W. Cover for floating boat dock. 4,683,901, Cl. 135-97.000.
MITEC Moderne Industrietechnik GmbH: *See—*
Mehnert, Walter, 4,685,043, Cl. 363-43.000.
Mitel Corporation: *See—*
Deveson, Daniel A.; and Bawcutt, Anthony J., 4,685,122, Cl. 379-90.000.
Lewis, Conrad, 4,685,102, Cl. 370-15.000.
Mitoff, Stephan P.: *See—*
Charles, Richard J.; Mitoff, Stephan P.; and Pasco, Wayne D., 4,684,446, Cl. 204-15.000.
Mitomi, Mitchio: *See—*
Kojima, Fumitoshi; and Mitomi, Mitchio, 4,684,893, Cl. 324-312.000.
Mitra, Gautam: *See—*
Dove, George B.; and Mitra, Gautam, 4,684,723, Cl. 530-351.000.
Mitrofanov, Nicholas M. Rhenium lined Geiger-Mueller tube. 4,684,806, Cl. 250-374.000.
Mitsubishi Cable Industries, Ltd.: *See—*
Hono, Susumu; Okuda, Ichiro; Ishihara, Hiroshi; and Hori, Masahiko, 4,685,113, Cl. 375-7.000.
Mitsubishi Chemical Industries Limited: *See—*
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, 4,684,651, Cl. 514-253.000.
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, 4,684,739, Cl. 549-350.000.
Kohyama, Katsuhisa; Miyamoto, Masaaki; Nakanishi, Hidemi; and Koga, Norimichi, 4,684,713, Cl. 528-315.000.
Taniguchi, Masao; Morita, Yoshiharu; Hayakawa, Shuzo; and Kawashima, Osamu, 4,684,732, Cl. 546-144.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Minematsu, Yoshihiko; Tanaka, Minoru; Yamamoto, Masayuki; and Sakamoto, Kenichiro, 4,684,313, Cl. 414-735.000.
Murakami, Hidenobu; and Yasunaga, Seiji, 4,684,782, Cl. 219-121.0EA.
Shikama, Toshihiro; Ota, Takahisa; Ishizaka, Michihiro; Kira, Hirofumi; Horiguchi, Akira; and Kooi, Yuji, 4,685,105, Cl. 370-86.000.
Sugihara, Shoichi; and Katoh, Sumio, 4,684,976, Cl. 358-31.000.
Tada, Shoji; and Ibuki, Koji, 4,685,018, Cl. 361-1.000.
Takano, Hajime; and Yamashita, Hiromitsu, 4,684,973, Cl. 357-68.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Fujimoto, Masashi; and Okazaki, Kazuo, 4,683,834, Cl. 114-294.000.
Masuda, Toshiro; Ishizuka, Kouichi; Fujita, Toshiji; and Kinoshita, Yoshio, 4,685,139, Cl. 382-1.000.
Mitsubishi Petrochemical Co., Ltd.: *See—*
Abe, Katsuhiro; Kobayashi, Yoshinobu; and Baba, Mitsuhige, 4,684,684, Cl. 524-227.000.
Mitsubishi Yuka Fine Chemicals Co., Ltd.: *See—*
Umezawa, Norihiro; and Hata, Kazuyuki, 4,684,407, Cl. 106-90.000.

Mitsui Kensetsu Kabushiki Kaisha: *See*—
Okamoto, Tadashi; Matsubara, Sumiyuki; and Handa, Masahisa, 4,684,567, Cl. 428-257.000.
Mitsui Petrochemical Industries: *See*—
Handa, Takayuki; Takeuchi, Yasushi; Kato, Masumi; and Seki, Hisazi, 4,684,430, Cl. 156-366.000.
Mitsui Toatsu Chemicals, Inc.: *See*—
Takenaka, Shinji; Oi, Ryu; and Shimakawa, Chitoshi, 4,684,449, Cl. 204-75.000.
Mittendorf, Gerhard, to Fag Kugelfischer Georg Schafer (KGaA). Sliding sleeve for clutches of automotive vehicles. 4,684,005, Cl. 192-98.000.
Mitutoyo Mfg.: *See*—
Hanaoka, Hiroshi; and Matsumiya, Sadayuki, 4,684,257, Cl. 356-374.000.
Miura, Kenji: *See*—
Nakajima, Shigeru; Minegishi, Kazushige; Miura, Kenji; Morie, Takashi; and Somatani, Toshifumi, 4,683,643, Cl. 437-203.000.
Miura, Makoto: *See*—
Takayanagi, Yoshiaki; Ishida, Masato; and Miura, Makoto, 4,684,239, Cl. 355-14.00R.
Miura, Masayoshi; and Iwasawa, Toshiyuki, to Matsushita Electric Industrial Co., Ltd. Method for operation of an ink jet printing head. 4,684,957, Cl. 346-1.100.
Miwa, Yoshiyuki: *See*—
Ashitaka, Hidetomo; Jinda, Kazuya; and Miwa, Yoshiyuki, 4,684,717, Cl. 534-586.000.
Ashitaka, Hidetomo; Jinda, Kazuya; and Miwa, Yoshiyuki, 4,684,718, Cl. 534-586.000.
Miyaake, Chiharu: *See*—
Tsumura, Akio; Yamamoto, Suguru; and Miyaake, Chiharu, 4,684,256, Cl. 356-367.000.
Miyabara, Shinji: *See*—
Hori, Takako; Myokan, Isao; and Miyabara, Shinji, 4,684,631, Cl. 514-51.000.
Miyaji, Kenichi; Toida, Shouji; and Arai, Yoshinori, to Nippon Sanso Kabushiki. Heat insulated cooking utensil. 4,684,057, Cl. 228-187.000.
Miyake, Kiyoshi: *See*—
Kimura, Shin-Ichiro; Murakami, Eiichi; Warabisako, Terunori; Miyake, Kiyoshi; and Sunami, Hideo, 4,683,838, Cl. 118-715.000.
Miyamoto, Hisashi: *See*—
Tone, Hitoshi; Miyamoto, Hisashi; Ueda, Hiraki; and Nakagawa, Kazuyuki, 4,684,648, Cl. 514-249.000.
Miyamoto, Masaaki: *See*—
Kohyama, Katsuhisa; Miyamoto, Masaaki; Nakanishi, Hidemi; and Koga, Norimichi, 4,684,713, Cl. 528-315.000.
Miyamoto, Shoji: *See*—
Nohmi, Makoto; Miyamoto, Shoji; Takaoka, Tadashi; and Oshima, Hiroyasu, 4,684,859, Cl. 318-317.000.
Miyamoto, Tetsuya; Omura, Takashi; Harada, Naoki; and Takeshita, Akira, to Sumitomo Chemical Company, Limited. Fiber-reactive phthalocyanine compound having both vinylsulfone type and dihalogenotriazinyl groups. 4,684,721, Cl. 540-126.000.
Miyazaki, Makoto: *See*—
Inoue, Hiroshi; Miyazaki, Makoto; Isoi, Masaaki; and Yoda, Makoto, 4,684,578, Cl. 428-462.000.
Miyazawa, Shintaro: *See*—
Kawasaki, Akihisa; Tada, Kohji; Kotani, Toshihiro; and Miyazawa, Shintaro, 4,684,515, Cl. 423-495.000.
Mizuhara, Howard, to GTE Products Corporation. Ductile low temperature brazing alloy foil. 4,684,579, Cl. 428-606.000.
Mizuno, Tiaki: *See*—
Sato, Yoshihisa; Kinugawa, Masumi; Akiyama, Susumu; Yamada, Toshitaka; Mizuno, Tiaki; and Suzuki, Atsushi, 4,683,858, Cl. 123-486.000.
Mizusawa, Akira, to Nifco, Inc. Filter device for in-tank type fuel pump for vehicle. 4,684,463, Cl. 210-172.000.
Mizushima, Yutaka: *See*—
Imagawa, Takashi; Yokoyama, Kazumasa; and Mizushima, Yutaka, 4,684,633, Cl. 514-78.000.
MKS Instruments, Inc.: *See*—
Benson, Richard A.; and Alden, David H., 4,683,910, Cl. 137-519.000.
Moberg, Gregory O., to Eastman Kodak Company. Capacitive load driver circuit. 4,684,824, Cl. 307-270.000.
Mobil Oil Corporation: *See*—
Avidan, Amos A.; Krambeck, Frederick J.; and Tabak, Samuel A., 4,684,757, Cl. 585-331.000.
Derr, W. Rodman, Jr.; Garwood, William E.; Kuo, James C.; Leib, Tiberiu M.; Nace, Donald M.; and Tabak, Samuel A., 4,684,756, Cl. 585-330.000.
Herrington, Fox J., 4,684,359, Cl. 493-211.000.
Mochizuki, Hiroyuki; Kobayashi, Nobuo; Inuzuka, Yutaka; Aiba, Shigeo; and Nishi, Setsuo, to Toyota Jidosha Kabushiki Kaisha. Rack guide in rack-and-pinion type steering gear. 4,683,769, Cl. 74-422.000.
Modic, Frank J.: *See*—
Eckberg, Richard P.; Striker, Richard A.; and Modic, Frank J., 4,684,670, Cl. 522-13.000.
Moeckel, Mark D.: *See*—
Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., 4,684,321, Cl. 415-202.000.
Moeller, Hinrich; and Wallat, Siegfried, to Henkel Kommanditgesellschaft auf Aktien. Sebosuppressive benzoic acid ester derivatives and cosmetic preparations containing them. 4,684,665, Cl. 514-543.000.
Mogler, Herr J.: *See*—
Gaul, Herr K.; Mogler, Herr J.; and Wiedmann, Herr H., 4,684,038, Cl. 222-89.000.
Mohney, Hubert L. R.: *See*—
Macemon, Herbert J.; Schlake, Randall L.; Fisher, John L.; Platt, Clair E.; and Mohney, Hubert L. R., 4,683,919, Cl. 140-92.200.
Mohring, Edgar; Muller, Hanns P.; Roessler, Peter; Wagner, Kuno; and Tietz, Helmut, to Bayer Aktiengesellschaft. Solubilizing biologically active compounds with reactive hydrogen. 4,684,728, Cl. 544-182.000.
Mojaverian, Parviz: *See*—
Repta, Arnold J.; and Mojaverian, Parviz, 4,684,630, Cl. 514-49.000.
Monarch Marking Systems, Inc.: *See*—
Duchin, Daniel, 4,683,635, Cl. 29-432.000.
Monica, Lisa R.: *See*—
Paperno, Steven H.; and Monica, Lisa R., 4,684,264, Cl. 368-283.000.
Monolithic Memories, Inc.: *See*—
France, Michael G.; Geannopoulos, George L.; Bosnyak, Robert J.; and Chan, Steve Y., 4,684,826, Cl. 307-272.00A.
Tsui, Cyrus; Chan, Andrew K. L.; Chan, Albert; Fitzpatrick, Mark E.; and Ansari, Zahid, 4,684,830, Cl. 307-465.000.
Monsanto Company: *See*—
Richard, Thomas J.; and Miller, William H., 4,684,483, Cl. 260-502.50F.
Montedipe S.p.A.: *See*—
Paparatto, Giuseppe, 4,684,749, Cl. 568-797.000.
Montedison S.p.A.: *See*—
Marraccini, Antonio; Carlini, Filippo M.; Pasquale, Antonio; and Pontevivo, Michele, 4,684,408, Cl. 106-300.000.
Montoya, Daniel D.: *See*—
Rice, Steven J.; Thompson, Gilbert M.; Dolph, Michael W.; and Montoya, Daniel D., 4,684,259, Cl. 366-185.000.
Moonen, Johannes J. E.: *See*—
Luijten, Waltherus J. T. H.; and Moonen, Johannes J. E., 4,684,317, Cl. 415-73.000.
Moore, James E.: *See*—
Margolin, Mark; Moore, James E.; and Grois, Igor, 4,684,205, Cl. 350-96.210.
Moore, Michael L.: *See*—
Callahan, James F.; Huffman, William F.; Moore, Michael L.; and Yim, Nelson C., 4,684,621, Cl. 514-11.000.
Moore, Stanley E., to Dow Chemical Company, The. Process for making a dehydrogenation catalyst having improved moisture stability. 4,684,619, Cl. 502-330.00.
Moore, Victor S.: *See*—
Rhodes, Joseph C., Jr.; Moore, Victor S.; and Kraft, Wayne R., 4,685,080, Cl. 364-900.000.
Moores, Gregory E.: *See*—
Dibbern, John E., Jr.; and Moores, Gregory E., 4,684,774, Cl. 200-275.000.
Moosmann, Horst: *See*—
Dinger, Horst; and Moosmann, Horst, 4,683,823, Cl. 102-229.000.
Morehouse, Alpha L.; and Krone, Pamela A., to Grain Processing Corporation. Low D.E. starch hydrolyzates. 4,684,410, Cl. 127-40.000.
Moreschi, Giovanni, to Latin Percussion, Inc. Portable musical instrument stand. 4,684,091, Cl. 248-166.000.
Mori, Kei. Device for diverting light through a plurality of optical conductor rods. 4,684,209, Cl. 350-96.150.
Mori, Masaaki; and Okada, Chiharu, to Ricoh Company, Ltd. Thermal recording system using unregulated power supply. 4,684,989, Cl. 346-76.0PH.
Mori, Shosuke: *See*—
Fujisaku, Kiminori; Awaga, Makoto; and Mori, Shosuke, 4,684,935, Cl. 340-717.000.
Moride, Shigeki: *See*—
Hattori, Toshihiro; Shishido, Katsuya; Kasai, Hitoshi; Moride, Shigeki; and Ogawa, Noriaki, 4,685,051, Cl. 364-424.100.
Morie, Takashi: *See*—
Nakajima, Shigeru; Minegishi, Kazushige; Miura, Kenji; Morie, Takashi; and Somatani, Toshifumi, 4,683,643, Cl. 437-203.000.
Moriguchi, Haruhiko: *See*—
Inui, Toshiharu; Moriguchi, Haruhiko; Hisatake, Masayuki; and Ohmori, Takashi, 4,685,069, Cl. 364-506.000.
Morimoto, Atsutaka, to Citizen Watch Co., Ltd. Driving circuit of stepping motor for floppy disk drive. 4,684,864, Cl. 318-696.000.
Morin, Jean-Xavier, to Framatome. Boiler with a circulating fluidized bed. 4,683,840, Cl. 122-4.00D.
Morin, Jean-Xavier; and Marcellin, Michel, to Framatome & Cie. Method for gasifying a material using a circulating fluidized bed. 4,684,375, Cl. 48-197.00R.
Morinaga, Akio: *See*—
Ohtsuga, Hisao; Morinaga, Akio; Sakaguchi, Yoichi; Hyodo, Masakatsu; and Yagi, Isaburo, 4,684,556, Cl. 428-36.000.
Morio, Kazuhiko: *See*—
Tsuchiya, Hiroshi; Morio, Kazuhiko; Murase, Hisashi; and Ohkawa, Kazuo, 4,684,671, Cl. 522-31.000.
Morita, Yoshiharu: *See*—
Taniguchi, Masao; Morita, Yoshiharu; Hayakawa, Shuzo; and Kawashima, Osamu, 4,684,732, Cl. 546-144.000.
Morita, Yukiji; and Yoshida, Masafumi, to Kaijo Denki Co., Ltd. Apparatus for measuring propagation time of ultrasonic waves. 4,685,075, Cl. 364-569.000.

Morse, Arthur L.; and Thompson, Niels A., to Hughes Aircraft Company. Low-noise charge-injection method and apparatus for IR CCD scanning. 4,684,800, Cl. 250-211.00J.

Morse, David L.: *See*—
Borrelli, Nicholas F.; and Morse, David L., 4,684,222, Cl. 350-420.000.

Mortvedt, Raymond L., to Ektelon. Graphite composite racquet with aramid core. 4,684,131, Cl. 273-73.00F.

Mosheim, Charles E.: *See*—
Bergman, Roger M.; and Mosheim, Charles E., 4,684,399, Cl. 75-0.5BB.

Mosimann, John G.: *See*—
Wassell, Mark E.; and Mosimann, John G., 4,684,326, Cl. 416-215.000.

Moskowitz, I., to Bethlehem Steel Corporation. Analog cam profile sensor system. 4,683,825, Cl. 105-148.000.

Moskowitz, Mark L., to GAF Corporation. UV stabilizer for polyacetylenic recording media. 4,684,688, Cl. 524-336.000.

Mosley, Charles G.: *See*—
Hunt, Eugene V.; Mosley, Charles G.; and Wheatley, Charles E., III, 4,684,903, Cl. 331-78.000.

Moss, William H.: *See*—
Johnson, Ralph K.; Azmi, Kaya; Keyes, Marion A., IV; and Moss, William H., 4,685,072, Cl. 364-551.000.

Mostert, Hubertus A. M.: *See*—
de Koning, Adrianus J.; Loontjens, Jacobus A.; Mostert, Hubertus A. M.; and Omloo, Hubertus A. A., 4,684,706, Cl. 526-262.000.

Motai, Hiroshi; Fukushima, Yaichi; and Ishiyama, Takashi, to Kikkoman Corporation. Process for producing seasoning. 4,684,527, Cl. 426-46.000.

Motorola, Inc.: *See*—
Adams, Victor J.; and Schofield, Brooks L., Jr., 4,683,757, Cl. 73-756.000.
Smith, Paul F.; Schorman, Eric R.; and Burke, Timothy M., 4,684,941, Cl. 340-825.520.
Toumayan, Burton B., 4,685,116, Cl. 377-51.000.
Varker, Charles J.; Wilson, Syd R.; and Burnham, Marie E., 4,683,637, Cl. 437-63.000.

Mount, Houston B., II, to Kera Corporation. Keratograph autoscanner system. 4,685,140, Cl. 382-6.000.

Mouries, Gerard, to Compagnie Europeenne de Composants Electroniques LCC. High current capacitor and method for manufacturing the same. 4,685,027, Cl. 361-308.000.

Moussouris, John P.: *See*—
Fok, Wilson W.; and Moussouris, John P., 4,684,921, Cl. 340-347.0DD.

Mt. Moriah Trust: *See*—
Hill, Gilman A.; Passamaneck, Richard S.; and Touryan, Kenell J., 4,683,943, Cl. 166-63.000.

Mueller, Dale A.: *See*—
Adams, John T.; and Mueller, Dale A., 4,684,060, Cl. 236-11.000.

Mueller, Walter B.; and Schirmer, Henry G., to W. R. Grace & Co., Cryovac Div. High oxygen barrier composite film. 4,684,573, Cl. 428-349.000.

Mukai, Hiroshi: *See*—
Shionozaki, Yoshio; Mukai, Hiroshi; Obikawa, Tsuyoshi; and Yamada, Shuhei, 4,684,220, Cl. 350-350.00R.

Mukherjee, Jyoti P.: *See*—
Furmanek, Robert A.; Mukherjee, Jyoti P.; and Lanese, Pasquale J., 4,684,266, Cl. 384-37.000.

Mulders, Johannes A., to Borg-Warner Corporation. Hydrostatic bearing for pumps and the like. 4,684,318, Cl. 415-113.000.

Muller, Hanns P.: *See*—
Mohring, Edgar; Muller, Hanns P.; Roessler, Peter; Wagner, Kuno; and Tietz, Helmut, 4,684,728, Cl. 544-182.000.

Multiflex, Inc.: *See*—
Abernathy, Earl D., 4,684,427, Cl. 156-244.120.

Munson, Robert E.; Haddad, Hussain A.; and Hanlen, John W., to Ball Corporation. Microstrip reflectarray for satellite communication and radar cross-section enhancement or reduction. 4,684,952, Cl. 343-700.0MS.

Munson, Robert E.: *See*—
Edwards, Carson P.; Huisjen, Martin A.; and Munson, Robert E., 4,684,929, Cl. 340-541.000.

Murakami, Eiichi: *See*—
Kimura, Shin-Ichiro; Murakami, Eiichi; Warabisako, Terunori; Miyake, Kiyoshi; and Sunami, Hideo, 4,683,838, Cl. 118-715.000.

Murakami, Hidenobu; and Yasunaga, Seiji, to Mitsubishi Denki Kabushiki Kaisha. Control system for a charged particle beam apparatus. 4,684,782, Cl. 219-121.0EA.

Murakami, Yasuji: *See*—
Ishihara, Koushi; Murakami, Yasuji; Yoshizawa, Nobuyuki; and Funaki, Kiyoshi, 4,684,213, Cl. 350-96.230.

Murali, Jagannathan; and Buck, Erwin, to Conoco Inc. Method for applying protective coatings. 4,684,447, Cl. 204-38.500.

Muramoto, Yutaka: *See*—
Kobayashi, Susumu; Muramoto, Yutaka; Ishizaka, Hideo; and Ishii, Yoshinori, 4,684,869, Cl. 320-2.000.

Murase, Hisashi: *See*—
Tsuchiya, Hiroshi; Morio, Kazuhiko; Murase, Hisashi; and Ohkawa, Kazuo, 4,684,671, Cl. 522-31.000.

Murata Kikai Kabushiki Kaisha: *See*—
Matsui, Isamu; Kimura, Hidetoshi; and Nakanishi, Kazuo, 4,683,713, Cl. 57-281.000.

Murata Manufacturing Co., Ltd.: *See*—
Maesaka, Michinobu; Watanabe, Koichi; and Murata, Michihiro, 4,683,639, Cl. 29-570.100.

Murata, Michihiro: *See*—
Maesaka, Michinobu; Watanabe, Koichi; and Murata, Michihiro, 4,683,639, Cl. 29-570.100.

Murata, Takeo: *See*—
Nishii, Michiharu; Furuta, Youichi; Tsubouchi, Kaoru; Murata, Takeo; Shibatani, Juichi; and Kiriyama, Takashi, 4,683,807, Cl. 92-169.000.

Murata, Toshiaki: *See*—
Horii, Kiyoshi; and Murata, Toshiaki, 4,684,296, Cl. 406-153.000.

Murata, Toshinori: *See*—
Nakagaki, Nobuhumi; Murata, Toshinori; and Kurita, Toshiyuki, 4,684,985, Cl. 358-140.000.

Murphy, Chester M., to Baker, Gerald G., a part interest. Ladder leveling apparatus. 4,683,983, Cl. 182-204.000.

Murphy, Chester M.: *See*—
Baker, Gerald G., 4,683,982, Cl. 182-204.000.

Murphy, Donald, to Piezo Electric Products, Inc. Acoustic pump. 4,684,328, Cl. 417-322.000.

Murphy, Patricia L.: *See*—
Hayes, Michael E.; Hrebenar, Kevin R.; Murphy, Patricia L.; Futch, Laurence E., Jr.; Deal, James F., III; and Bolden, Paul L., Jr., 4,684,372, Cl. 44-51.000.

Murphy, Thomas: *See*—
Salmon, Michael E., 4,683,977, Cl. 180-334.000.

Muta, Tomonobu: *See*—
Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, 4,684,601, Cl. 430-284.000.

Myokan, Isao: *See*—
Hori, Takako; Myokan, Isao; and Miyabara, Shinji, 4,684,631, Cl. 514-51.000.

N. B. Love Industries Pty. Limited: *See*—
Linke, Kaljo; and Neale, Raymond B., 4,683,837, Cl. 118-612.000.

Nace, Donald M.: *See*—
Derr, W. Rodman, Jr.; Garwood, William E.; Kuo, James C.; Leib, Tiberiu M.; Nace, Donald M.; and Tabak, Samuel A., 4,684,756, Cl. 585-330.000.

Naem, Abdalla A.: *See*—
Naguib, Hussein M.; Calder, Iain D.; Ho, Vu Q.; and Naem, Abdalla A., 4,683,645, Cl. 437-41.000.

Nagamori, Nobuyuki: *See*—
Funakawa, Naoyoshi; Demura, Hajime; and Nagamori, Nobuyuki, 4,684,297, Cl. 407-41.000.

Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, to Sumitomo Chemical Company, Limited. 2-Substituted phenyl-4,5,6,7-tetrahydro-2H-iso-indole-1,3-diones, and their production and use. 4,684,397, Cl. 71-96.000.

Nagano Keiki Seisakusho, Ltd.: *See*—
Maruno, Naohiko; Abe, Masakazu; and Ogawa, Tetsuo, 4,684,842, Cl. 310-316.000.

Naguib, Hussein M.; Calder, Iain D.; Ho, Vu Q.; and Naem, Abdalla A., to Northern Telecom Limited. Process of fabricating MOS devices having shallow source and drain junctions. 4,683,645, Cl. 437-41.000.

Nagy, Geza T.; Szepesi, Gabor; Gazdag, Maria; Papp nee Sziklay, Zsofia; and Burger, Kalman, to Richter Gedeon Vegyeszeti Gyar Rt. Metal complexes of bis-indole compounds and aqueous pharmaceutical compositions containing them. 4,684,638, Cl. 514-185.000.

Najm, Elie M.: *See*—
Driscoll, Carleton D.; Najm, Elie M.; and Waechter, Manfred, 4,685,020, Cl. 361-18.000.

Naka, Takahiro, to Seiko Epson Kabushiki Kaisha. Nozzle cover assembly for an ink-on-demand type ink jet printer. 4,684,963, Cl. 346-140.00R.

Nakagaki, Nobuhumi; Murata, Toshinori; and Kurita, Toshiyuki, to Hitachi, Ltd. Signal converting method and circuit for television receiver. 4,684,985, Cl. 358-140.000.

Nakagawa, Kazuyuki: *See*—
Tone, Hitoshi; Miyamoto, Hisashi; Ueda, Hiraki; and Nakagawa, Kazuyuki, 4,684,648, Cl. 514-249.000.

Nakagawa, Yukio; Kakita, Yukio; and Kitagawa, Kazumi, to Ishida Scales Mfg. Co., Ltd. Weighing system. 4,683,966, Cl. 177-25.000.

Nakai, Masayoshi: *See*—
Igusa, Masaru; and Nakai, Masayoshi, 4,683,666, Cl. 34-67.000.

Nakajima, Shigeru; Minegishi, Kazushige; Miura, Kenji; Morie, Takashi; and Somatani, Toshifumi, to Nippon Telegraph and Telephone Corporation. Method of manufacturing a vertical MOSFET with single surface electrodes. 4,683,643, Cl. 437-203.000.

Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, to Dainippon Ink and Chemicals, Inc. Photosensitive image-forming material having a layer of photosensitive polyester modified with chain extender. 4,684,601, Cl. 430-284.000.

Nakamura, Eiji: *See*—
Itoh, Katsuhisa; Watanabe, Yoshiaki; Nakamura, Eiji; and Toyoshima, Masayasu, 4,684,448, Cl. 204-71.000.

Nakamura, Naoji: *See*—
Masumoto, Hakaru; and Nakamura, Naoji, 4,684,416, Cl. 148-430.000.

Nakamura, Toshiaki: *See*—
Kaieda, Osamu; Awashima, Masaru; Okitaka, Isao; and Nakamura, Toshiaki, 4,684,734, Cl. 546-345.000.

Nakamura, Tsutomu; and Matsumoto, Kazuya, to Olympus Optical Co., Ltd. Solid state image sensor having means to reset and clear static induction transistor photoelements. 4,684,992, Cl. 358-213.120.

Nakamura, Yasunori: *See—*
Ueno, Ryuzo; Sakota, Kazuyuki; and Nakamura, Yasunori, 4,684,712, Cl. 528-190.000.

Nakamura, Yoshikatsu: *See—*
Ooi, Katsunori; Hidai, Yutaka; Kurosawa, Yoshiaki; and Nakamura, Yoshikatsu, 4,685,142, Cl. 382-13.000.

Nakanishi, Hidemi: *See—*
Kohyama, Katsuhisa; Miyamoto, Masaaki; Nakanishi, Hidemi; and Koga, Norimichi, 4,684,713, Cl. 528-315.000.

Nakanishi, Kazuo: *See—*
Matsui, Isamu; Kimura, Hidetoshi; and Nakanishi, Kazuo, 4,683,713, Cl. 57-281.000.

Nakao, Kenichiro: *See—*
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, 4,684,651, Cl. 514-253.000.
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, 4,684,739, Cl. 549-350.000.

Nakasuji, Mamoru, to Kabushiki Kaisha Toshiba. Method of adjusting optical column in energy beam exposure system. 4,684,809, Cl. 250-492.200.

Nakayama, Hitoshi, to Honda Giken Kogyo Kabushiki Kaisha. Inhibitor means for a starter device in a multi-transmission motor vehicle. 4,683,777, Cl. 74-850.000.

Nalge Company: *See—*
Brockway, Charles E.; and Saeli, John J., 4,684,344, Cl. 433-81.000.

Namai, Akihiro: *See—*
Kodaira, Takanori; Namai, Akihiro; and Egawa, Akira, 4,684,233, Cl. 354-400.000.

Nanjoh, Hideo, to Omron Tateisi Electronics Co. Component mounting device. 4,685,035, Cl. 361-429.000.

Nara, Masaji: *See—*
Yasufuku, Yoshitaka; Nara, Masaji; and Akutsu, Shigeru, 4,684,572, Cl. 428-323.000.

Nasuno, Toshihiro: *See—*
Watanabe, Nobuhisa; Iwamoto, Hisao; Nasuno, Toshihiro; and Sakamaki, Yoshio, 4,684,017, Cl. 206-235.000.

National Semiconductor Corporation: *See—*
Takiar, Hem P.; and Mehta, Kamal N., 4,684,975, Cl. 357-70.000.

National Starch and Chemical Corporation: *See—*
Yannich, Marie E.; and Katz, Howard G., 4,684,689, Cl. 524-371.000.

Natoli, Richard A.: *See—*
Beck, Lawrence R.; Kocjan, Andrew J.; Natoli, Richard A.; and Liguore, Louis J., 4,684,765, Cl. 174-68.500.

Naud, Henry, to Societe Nationale d'Etude et de Construction de Moteur d'Aviation "S.N.E.C.M.A.". Structural cowlings of twin flow turbo jet engines. 4,683,717, Cl. 60-226.100.

Navistar International Corporation: *See—*
Mann, Joseph M.; and Spitler, James A., 4,684,786, Cl. 219-297.000.

Nazarian, Ara W.; and Stupeck, Donald G., to Computer Memories, Incorporated. Disk drive with track zero location system. 4,685,007, Cl. 360-78.000.

NCR Canada Ltd - NCR Canada Ltee: *See—*
Hoque, Zahirul; and Oka, Akihiro, 4,685,141, Cl. 382-7.000.

NCR Corporation: *See—*
Del Signore, James R., II, 4,683,817, Cl. 101-93.030.

Neal Manufacturing Company, Inc.: *See—*
Bagwell, Maury L., 4,684,062, Cl. 239-1.000.

Neale, Raymond B.: *See—*
Linke, Kaljo; and Neale, Raymond B., 4,683,837, Cl. 118-612.000.

Nebolsine, Peter E.: *See—*
Frish, Michael B.; Nebolsine, Peter E.; and Pirri, Anthony N., 4,684,781, Cl. 219-121.0LU.

NEC Corporation: *See—*
Hirano, Akira, 4,684,984, Cl. 358-136.000.
Inoue, Tatsuo, 4,685,033, Cl. 361-414.000.
Koga, Toshio, 4,684,923, Cl. 340-347.0DD.
Maruta, Rikio, 4,684,925, Cl. 340-347.0AD.
Taguchi, Kenko, 4,684,969, Cl. 357-30.000.

Needham, Eric, to Engelhard Corporation. Controlled electrical contacts for electrical switchgear. 4,685,019, Cl. 361-2.000.

Neeser, Timothy A., to Minnesota Valley Engineering, Inc. Carbonated beverage storage and dispensing system and method. 4,683,921, Cl. 141-1.000.

Neft, Charles L., to Westinghouse Electric Corp. Unrestricted frequency changer switch topology. 4,685,049, Cl. 363-159.000.

Nehmer, Carl A.; and Hocken, Lary R., to General Motors Corporation. Adaptive controller for a motor vehicle engine throttle operator. 4,684,866, Cl. 318-696.000.

Nelsen, Christopher P.; and Melton, Robert L., to Dana Corporation. Vibration detector. 4,683,753, Cl. 73-655.000.

Nelson, Gordon J. Door security device. 4,684,160, Cl. 292-340.000.

Nelson, Marvin A. Hexagram game board, apparatus and game. 4,684,134, Cl. 273-261.000.

Nelson, Phil L.: *See—*
Foster, Donald D.; and Nelson, Phil L., 4,684,046, Cl. 222-451.000.

Nelson, Roy A.; Entriken, Raymond A.; and Grieves, Randolph C., to Epworth Manufacturing Co., Inc. Blade for centrifugal media mill. 4,684,072, Cl. 241-172.000.

Nepera Inc.: *See—*
Keusch, Preston; and Essmyer, John L., 4,684,558, Cl. 428-40.000.

Neri, Carlo: *See—*
Greco, Alberto; Busetto, Carlo; Cassar, Luigi; and Neri, Carlo, 4,684,726, Cl. 544-69.000.

Nestegard, Sander C. Multiple exercise unit. 4,684,121, Cl. 272-97.000.

Nettmann, Ernst F., to Matthews Studio Electronics. Balancing gear apparatus for remote positioning device. 4,683,770, Cl. 74-425.000.

Neuhauser, Johannn; and Brauch, Hans-Joachim, to Salzgitter Maschinen und Anlagen Aktiengesellschaft. Pump drive for deep well pumping installations. 4,683,764, Cl. 74-41.000.

Neumann, Bernhard, to General Motors Corporation. Automotive outside rearview mirror. 4,684,216, Cl. 350-279.000.

Neumeyer, Stefan. Dental retention pins. 4,684,555, Cl. 428-36.000.

New York Telephone Company: *See—*
Silverbush, Jerome, 4,685,126, Cl. 379-146.000.

Newlove, John C.: *See—*
Peiffer, Dennis G.; Lundberg, Robert D.; Sedillo, Lawrence; and Newlove, John C., 4,683,952, Cl. 166-293.000.

Newmayer, Ricky L. Roof hinged door apparatus. 4,684,167, Cl. 296-202.000.

NGK Spark Plug Co., Ltd.: *See—*
Ohya, Kanji; and Achiha, Hikaru, 4,684,843, Cl. 310-355.000.

NI Industries, Inc.: *See—*
Hempelmann, Heinrich J., 4,683,629, Cl. 29-159.00A.

Nichols, E. Lane, III; Hooper, William P.; and Leynse, Kenneth J., to Square D Company. Ground fault circuit interrupter capable of deriving energy from ground fault current in order to achieve circuit interruption in the presence of a reduced supply voltage. 4,685,022, Cl. 361-44.000.

Nichols, Steve: *See—*
Tiffany, Burris D.; Nichols, Steve; Meulman, Paul A.; Hylton, Thomas A.; and Lipton, Michael F., 4,684,725, Cl. 540-565.000.

Nickels, Richard C., Jr., to General Instrument Corp. Multiple input compact ticket processor. 4,684,792, Cl. 235-384.000.

Nicolas, Gerard: *See—*
Massit, Claude; Nicolas, Gerard; and Turc, Gerard, 4,684,181, Cl. 439-59.000.

Nicoletti, Alberto: *See—*
Marchionni, Giuseppe; Tonelli, Claudio; and Nicoletti, Alberto, 4,684,452, Cl. 204-157.940.

Niebling, Tracy J.; and Bieger, Walter I., to Fluoroware, Inc. Bottom loading wafer carrier box. 4,684,021, Cl. 206-334.000.

Nieglos, Donald J.: *See—*
Appelbaum, Matthew A.; Lehman, David B.; Nieglos, Donald J.; Nolte, Stanley C.; and Oehler, Michael P., 4,683,968, Cl. 380-4.000.

Nielsen, Darryl M.: *See—*
LaGrange, Nyle D.; Nielsen, Darryl M.; and Wheeler, Charles F., 4,684,331, Cl. 417-366.000.

Nieman Design Systems Inc.: *See—*
Gurzynski, Richard M., 4,684,030, Cl. 211-88.000.

Niemeyer, Lutz, to BBC Brown, Boveri & Company, Limited. Gas-blast switch. 4,684,773, Cl. 200-148.00R.

Nifco, Inc.: *See—*
Mizusawa, Akira, 4,684,463, Cl. 210-172.000.

Nigorikawa, Kazunori: *See—*
Kitano, Kisei; Ogawa, Tetsuya; Furukawa, Yoshito; Yoshida, Naoyuki; Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; and Nigorikawa, Kazunori, 4,684,476, Cl. 252-299.610.
Sugimori, Shigeru; Nigorikawa, Kazunori; and Ogawa, Tetsuya, 4,684,477, Cl. 252-299.610.
Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Ogawa, Tetsuya; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,684,478, Cl. 252-299.630.

Nikkiso Co., Ltd.: *See—*
Hashimoto, Kazuaki, 4,684,329, Cl. 417-357.000.

Nikulin, Heikki: *See—*
Kukka, Aarre; Tervamaki, Jukka; Nikulin, Heikki; and Vuorinen, Olavi, 4,684,250, Cl. 356-246.000.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Nishi, Kazuhiko; Ishii, Takatoshi; Yamashita, Ryozo; Yamaoka, Shigemitsu; and Okumura, Takatoshi, 4,684,942, Cl. 340-703.000.

Nippon Kogaku K. K.: *See—*
Kazami, Kazuyuki, 4,684,232, Cl. 354-400.000.

Nippon Notion Kogyo Co., Ltd.: *See—*
Watanabe, Hirokazu, 4,683,621, Cl. 24-95.000.

Nippon Sanso Kabushiki: *See—*
Miyaji, Kenichi; Toida, Shouji; and Arai, Yoshinori, 4,684,057, Cl. 228-187.000.

Nippon Shokubai KK Co., Ltd.: *See—*
Kaieda, Osamu; Awashima, Masaru; Okitaka, Isao; and Nakamura, Toshiaki, 4,684,734, Cl. 546-345.000.

Nippon Soken, Inc.: *See—*
Kitamura, Sotoo; Akita, Shigeyuki; and Kago, Yoshiyuki, 4,684,943, Cl. 340-825.720.

Nippon Steel Corporation: *See—*
Takafuji, Hideo, 4,684,293, Cl. 405-224.000.

Nippon Telegraph and Telephone Corporation: *See—*
Nakajima, Shigeru; Minegishi, Kazushige; Miura, Kenji; Morie, Takashi; and Somatani, Toshifumi, 4,683,643, Cl. 437-203.000.

Nippon Telegraph & Telephone Public Corporation: *See—*
Ishihara, Koushi; Murakami, Yasuji; Yoshizawa, Nobuyuki; and Funaki, Kiyoshi, 4,684,213, Cl. 350-96.230.
Kawasaki, Akihisa; Tada, Kohji; Kotani, Toshihiro; and Miyazawa, Shintaro, 4,684,515, Cl. 423-495.000.

Nippon Zeon Co., Ltd.: *See—*
Horino, Hiroshi; Ohnaka, Michiro; Hayashi, Atsushi; and Ikeno, Yoshiko, 4,684,737, Cl. 549-240.000.

Nippondenso Co., Ltd.: *See*—
Sato, Yoshihisa; Kinugawa, Masumi; Akiyama, Susumu; Yamada, Toshitaka; Mizuno, Tiaki; and Suzuki, Atsushi, 4,683,858, Cl. 123-486.000.
Tamura, Hiroshi; Nishibori, Kazuyoshi; Yamauchi, Yasutaka; and Kato, Katsushi, 4,683,859, Cl. 123-491.000.
Nirasawa, Mituharu: *See*—
Seshimoto, Osamu; Nirasawa, Mituharu; Terashima, Masaaki; and Saito, Yoshio, 4,684,445, Cl. 204-1.00T.
Nishi, Kazuhiko; Ishii, Takatoshi; Yamashita, Ryozo; Yamaoka, Shigemitsu; and Okumura, Takatoshi, to Ascii Corporation; and Nippon Gakki Seizo Kabushiki Kaisha. Video display controller. 4,684,942, Cl. 340-703.000.
Nishi, Setsuo: *See*—
Mochizuki, Hiroyuki; Kobayashi, Nobuo; Inuzuka, Yutaka; Aiba, Shigeo; and Nishi, Setsuo, 4,683,769, Cl. 74-422.000.
Nishibori, Kazuyoshi: *See*—
Tamura, Hiroshi; Nishibori, Kazuyoshi; Yamauchi, Yasutaka; and Kato, Katsushi, 4,683,859, Cl. 123-491.000.
Nishida, Hiroshi, to Kawasaki Jukogyo Kabushiki Kaisha. Small self-righting water craft. 4,683,829, Cl. 114-125.000.
Nishiguchi, Masayuki: *See*—
Akagiri, Kenzo; and Nishiguchi, Masayuki, 4,685,115, Cl. 375-25.000.
Nishii, Michiharu; Furuta, Youichi; Tsubouchi, Kaoru; Murata, Takeo; Shibatani, Juichi; and Kiriyama, Takashi, to Aisin Seiki Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Vacuum brake booster assembly. 4,683,807, Cl. 92-169.000.
Nishijima, Toyoki; and Onodera, Kaoru, to Konishiroku Photo Industry Co., Ltd. Light-sensitive silver halide color photographic material. 4,684,603, Cl. 430-372.000.
Nishikawa, Yoshihiro; Kanemitsu, Kimihiro; Katori, Tatsuhiko; Shibata, Akihiro; and Kukita, Kenichi, to SS Pharmaceutical Co., Ltd. α,α-trehalose fatty acid diester derivative. 4,684,719, Cl. 536-119.000.
Nishimura, Atsushi: *See*—
Kubota, Naohiro; and Nishimura, Atsushi, 4,684,679, Cl. 524-91.000.
Kubota, Naohiro; Shibata, Toshihiro; and Nishimura, Atsushi, 4,684,680, Cl. 524-91.000.
Nishiwaki, Tsutomu, to Seiko Epson Kabushiki Kaisha. Thermoelectric printing apparatus. 4,684,960, Cl. 346-76.0PH.
Nishizawa, Jun-ichi: *See*—
Ohta, Yoshinori; and Nishizawa, Jun-ichi, 4,684,968, Cl. 357-30.000.
Nishizawa, Junichi; Suzuki, Sobei; and Tamamushi, Takashige, to Nishizawa, Junichi. Static induction transistor photodetector having a deep shielding gate region. 4,684,966, Cl. 357-22.000.
Nisso Sangyo Co., Ltd.: *See*—
Ono, Tatsuo; Masuda, Akira; and Kuramoto, Kikuzo, 4,684,034, Cl. 220-6.000.
Nitto Electric Industrial Co., Ltd.: *See*—
Tsumura, Akio; Yamamoto, Suguru; and Miyaake, Chiharu, 4,684,256, Cl. 356-367.000.
Niwa, Takao: *See*—
Osanai, Akinori; Niwa, Takao; and Gono, Takeshi, 4,683,779, Cl. 74-861.000.
"Niwe" Ing. Kamhuber & Co. KG: *See*—
Kamhuber, Peter, 4,684,793, Cl. 235-449.000.
Nixdorf Computer AG: *See*—
Holland-Letz, Guenter, 4,684,794, Cl. 235-449.000.
Noguchi, Takaharu: *See*—
Takahashi, Hiroaki; Kobayashi, Masaharu; Noguchi, Takaharu; Shibuya, Toshifumi; and Arai, Takao, 4,685,004, Cl. 360-32.000.
Nohmi, Makoto; Miyamoto, Shoji; Takaoka, Tadashi; and Oshima, Hiroyasu, to Hitachi, Ltd. Chopper control system. 4,684,859, Cl. 318-317.000.
Nolte, Stanley C.: *See*—
Appelbaum, Matthew A.; Lehman, David B.; Nieglos, Donald J.; Nolte, Stanley C.; and Oehler, Michael P., 4,683,968, Cl. 380-4.000.
Nomura, Yasushi: *See*—
Makiguchi, Kyoko; Sagusa, Hisayuki; and Nomura, Yasushi, 4,684,252, Cl. 356-328.000.
Norcia, John A.; Wheatley, William M.; and Norcia, Michael D., to Ram Automotive Company. Nitrous oxide fuel injection safety system. 4,683,843, Cl. 123-1.00A.
Norcia, Michael D.: *See*—
Norcia, John A.; Wheatley, William M.; and Norcia, Michael D., 4,683,843, Cl. 123-1.00A.
Norfleet, James: *See*—
Clipper, Donald; and Norfleet, James, 4,684,517, Cl. 424-52.000.
Norling, Rayburn E.: *See*—
Huisinga, Richard D.; and Norling, Rayburn E., 4,683,811, Cl. 98-42.200.
Noro, Osamu: *See*—
Doi, Yoshiki; Inabe, Mitsuo; and Noro, Osamu, 4,683,723, Cl. 62-6.000.
Norris, Richard G.; Webb, Monty F.; and Le, Vinh Q., to Teccor Electronics, Inc. Electronic trigger switch for maintenance termination unit. 4,685,120, Cl. 379-26.000.
North American Philips Corporation: *See*—
Mayo, William T., 4,683,893, Cl. 128-660.000.
Northern Telecom Limited: *See*—
Este, Grantley O.; Suthers, Mark S.; Streater, Richard W.; and MacLaurin, Blair K., 4,684,841, Cl. 310-313.00B.
Little, Thomas N.; Longo, Lorenzo L.; and Chan, Sun-Shiu D., 4,684,832, Cl. 307-520.000.
Naguib, Hussein M.; Calder, Iain D.; Ho, Vu Q.; and Naem, Abdalla A., 4,683,645, Cl. 437-41.000.
Norwood, Roger D.: *See*—
Patel, Pravin P.; and Norwood, Roger D., 4,685,089, Cl. 365-233.000.
NTN Toyo Bearing Co., Ltd.: *See*—
Kimata, Kei; Kato, Masahiro; and Shibata, Ko, 4,684,356, Cl. 464-111.000.
Nuijten, Petrus A. C. M.: *See*—
Steenhof, Frits A.; Welles, Petrus W. G.; Nuijten, Petrus A. C. M.; and van der Meer, Jan, 4,684,986, Cl. 358-148.000.
Nunokawa, Tadao. Portable cart. 4,684,141, Cl. 280-40.000.
Nupro Company: *See*—
Kolenc, Terrence J.; Bork, Carl R., Jr.; Steiss, William C.; Shufflebarger, Earl D.; and Tobbe, William P., 4,684,106, Cl. 251-335.200.
O&K Orenstein & Koppel Aktiengesellschaft: *See*—
Clemens, Karl-Heinz, 4,683,959, Cl. 172-795.000.
Oba, Hiroki, to Alps Electric Co. Miniature push button switch with coil spring movable contact. 4,684,775, Cl. 200-276.000.
Oba, Yoichi: *See*—
Iwasa, Yamahiro; Kabe, Atsushi; and Oba, Yoichi, 4,684,054, Cl. 228-180.100.
Obara, Haruki: *See*—
Kinoshita, Mitsuo; and Obara, Haruki, 4,685,064, Cl. 364-474.000.
Obata, Kosei: *See*—
Matsunaga, Hiroshi; Shimojima, Yoji; Tokunaga, Ichiro; and Obata, Kosei, 4,684,210, Cl. 350-96.200.
Oberg Enterprises, Inc.: *See*—
Butler, David L., 4,684,162, Cl. 294-82.120.
Obikawa, Tsuyoshi: *See*—
Shionozaki, Yoshio; Mukai, Hiroshi; Obikawa, Tsuyoshi; and Yamada, Shuhei, 4,684,220, Cl. 350-350.00R.
O'Brien, Gerard T. Reduction of bacteria count on poultry being processed into food at a poultry processing plant. 4,683,618, Cl. 17-51.000.
O'Brien, Lawrence E.: *See*—
Copland, Donald S.; Halstead, Larry D.; and O'Brien, Lawrence E., 4,684,025, Cl. 206-484.000.
Ocean Cable Co., Ltd.: *See*—
Ishihara, Koushi; Murakami, Yasuji; Yoshizawa, Nobuyuki; and Funaki, Kiyoshi, 4,684,213, Cl. 350-96.230.
Ochiai, Michihiko; Kishimoto, Shoji; and Matsuo, Taisuke, deceased (by Matsuo, Michiko, legal representative), to Takeda Chemical Industries, Ltd. 4-Cyano-2-azetidinones and production thereof. 4,684,724, Cl. 540-355.000.
Odmark, Anders: *See*—
Forchheimer, Robert; and Odmark, Anders, 4,684,991, Cl. 358-213.110.
Oe, Kouji: *See*—
Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, 4,684,601, Cl. 430-284.000.
Oehler, Michael P.: *See*—
Appelbaum, Matthew A.; Lehman, David B.; Nieglos, Donald J.; Nolte, Stanley C.; and Oehler, Michael P., 4,683,968, Cl. 380-4.000.
Oehler, Reinhard: *See*—
Lattion, Andre ; Carl, Alfred; and Oehler, Reinhard, 4,684,307, Cl. 4i4-31.000.
Oehlke, Donald N., to Eaton Corporation. Releasable fastener. 4,683,622, Cl. 24-458.000.
Oestreich, Ulrich: *See*—
Goldmann, Horst; Mayr, Ernst; and Oestreich, Ulrich, 4,684,214, Cl. 350-96.230.
Officine Augusto Cattani & C.S.p.A.: *See*—
Cattani, Augusto, 4,684,345, Cl. 433-92.000.
Ogawa, Noriaki: *See*—
Hattori, Toshihiro; Uchiyama, Nobuichi; Asagi, Yasuyoshi; Ogawa, Noriaki; and Kasai, Hitoshi, 4,683,996, Cl. 192-0.033.
Hattori, Toshihiro; Shishido, Katsuya; Kasai, Hitoshi; Moride, Shigeki; and Ogawa, Noriaki, 4,685,051, Cl. 364-424.100.
Ogawa, Tetsuo: *See*—
Maruno, Naohiko; Abe, Masakazu; and Ogawa, Tetsuo, 4,684,842, Cl. 310-316.000.
Ogawa, Tetsuya: *See*—
Kitano, Kisei; Ogawa, Tetsuya; Furukawa, Yoshito; Yoshida, Naoyuki; Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; and Nigorikawa, Kazunori, 4,684,476, Cl. 252-299.610.
Sugimori, Shigeru; Nigorikawa, Kazunori; and Ogawa, Tetsuya, 4,684,477, Cl. 252-299.610.
Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Ogawa, Tetsuya; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,684,478, Cl. 252-299.630.
Ohkawa, Kazuo: *See*—
Tsuchiya, Hiroshi; Morio, Kazuhiko; Murase, Hisashi; and Ohkawa, Kazuo, 4,684,671, Cl. 522-31.000.
Ohlbach, Ralph C., to Conductive Container, Inc. Conductive container. 4,684,020, Cl. 206-328.000.
Ohmori, Akira: *See*—
Yamamoto, Fumio; Suzuki, Takayoshi; Ikari, Masahiro; Saito, Susumu; Ohmori, Akira; and Yasuhara, Takashi, 4,684,705, Cl. 526-246.000.

Ohmori, Atsushi: *See*—
Uriuhara, Makoto; and Ohmori, Atsushi, 4,685,062, Cl. 364-424.100.
Ohmori, Takashi: *See*—
Inui, Toshiharu; Moriguchi, Haruhiko; Hisatake, Masayuki; and Ohmori, Takashi, 4,685,069, Cl. 364-506.000.
Ohms, Franz, to ANT Nachrichtentechnik GmbH. Circuit arrangement for detecting a current in power supply devices. 4,684,827, Cl. 307-413.000.
Ohnaka, Michiro: *See*—
Horino, Hiroshi; Ohnaka, Michiro; Hayashi, Atsushi; and Ikeno, Yoshiko, 4,684,737, Cl. 549-240.000.
Ohta, Eiichi: *See*—
Sakakibara, Kenji; Harano, Tetsuo; Bandai, Yasuhito; and Ohta, Eiichi, 4,684,999, Cl. 358-294.000.
Ohta, Yoshinori; and Nishizawa, Jun-ichi, to Olympus Optical Co., Ltd.; and Nishizawa, Jun-ichi. JFET imager having light sensing inversion layer induced by insulator charge. 4,684,968, Cl. 357-30.000.
Ohtsu, Keiichiro: *See*—
Futamura, Kenichiro; and Ohtsu, Keiichiro, 4,683,804, Cl. 92-71.000.
Ohtsuga, Hisao; Morinaga, Akio; Sakaguchi, Yoichi; Hyodo, Masakatsu; and Yagi, Isaburo, to Tokyo Gas Co., Ltd. Tubular lining material for pipe line. 4,684,556, Cl. 428-36.000.
Ohya, Kanji; and Achiha, Hikaru, to NGK Spark Plug Co., Ltd. Piezoresonator and manufacturing method therefor. 4,684,843, Cl. 310-355.000.
Ohyama, Masao, to Sony Corporation. Magnetic recording and/or reproducing apparatus with tape loading and reel braking mechanisms which are controlled in common. 4,685,008, Cl. 360-85.000.
Oi, Ryu: *See*—
Takenaka, Shinji; Oi, Ryu; and Shimakawa, Chitoshi, 4,684,449, Cl. 204-75.000.
Ojha, Suresh M.: *See*—
Heinecke, Rudolf A. H.; Ojha, Suresh M.; and Llewellyn, Ian P., 4,684,535, Cl. 427-38.000.
Oka, Akihiro: *See*—
Hoque, Zahirul; and Oka, Akihiro, 4,685,141, Cl. 382-7.000.
Okada, Chiharu: *See*—
Mori, Masaaki; and Okada, Chiharu, 4,684,959, Cl. 346-76.0PH.
Okada, Kazuo: *See*—
Hirakawa, Norishige; Okada, Kazuo; and Sato, Kazuhiko, 4,684,333, Cl. 417-420.000.
Okajima, Atsushi: *See*—
Yamano, Fumiyuki; and Okajima, Atsushi, 4,685,060, Cl. 364-419.000.
Okamoto, Tadashi; Matsubara, Sumiyuki; and Handa, Masahisa, to Mitsui Kensetsu Kabushiki Kaisha. Reinforced structural material and reinforced fibrous inorganic structure reinforced therewith. 4,684,567, Cl. 428-257.000.
Okamura, Kazuo; Koyama, Satoshi; Maeda, Tadayuki; and Kamihigoshi, Tutomu, to Daikin Kogyo Co., Ltd. Active materials for batteries. 4,684,591, Cl. 429-218.000.
Okazaki, Kazuo: *See*—
Fujimoto, Masashi; and Okazaki, Kazuo, 4,683,834, Cl. 114-294.000.
Oki Electric Industry Co., Ltd.: *See*—
Tange, Kohsuke; Takahashi, Osamu; Furuya, Yuhki; and Harada, Akira, 4,683,644, Cl. 437-7.000.
Okimoto, Haruo: *See*—
Matsuura, Masahiko; Doi, Nobuo; Yoshioka, Sadashichi; Okimoto, Haruo; and Ueda, Kazuhiko, 4,683,856, Cl. 123-436.000.
Okitaka, Isao: *See*—
Kaieda, Osamu; Awashima, Masaru; Okitaka, Isao; and Nakamura, Toshiaki, 4,684,734, Cl. 546-345.000.
Okiyama, Yoichi: *See*—
Kinoshita, Tomoaki; Takano, Kunio; Okiyama, Yoichi; and Tachikawa, Osamu, 4,683,827, Cl. 112-121.120.
Okuda, Ichiro: *See*—
Hono, Susumu; Okuda, Ichiro; Ishihara, Hiroshi; and Hori, Masahiko, 4,685,113, Cl. 375-7.000.
Okumura, Takatoshi: *See*—
Nishi, Kazuhiko; Ishii, Takatoshi; Yamashita, Ryozo; Yamaoka, Shigemitsu; and Okumura, Takatoshi, 4,684,942, Cl. 340-703.000.
Olander, Walter K.: *See*—
Lee, Gim F., Jr.; and Olander, Walter K., 4,684,681, Cl. 524-127.000.
Olin Hunt Specialty Products, Inc.: *See*—
Minten, Karl L.; and Pismennaya, Galina, 4,684,560, Cl. 428-131.000.
Olivetti Synthesis, S.p.A.: *See*—
Galli, Massimo, 4,683,695, Cl. 52-221.000.
Olivieri, Oliviero, to Icaro Olivieri & C. S.p.A. Extendible roller skate. 4,684,140, Cl. 280-11.260.
Olympus Optical Co., Ltd.: *See*—
Imade, Shinichi; and Karaki, Kouichi, 4,683,751, Cl. 73-606.000.
Nakamura, Tsutomu; and Matsumoto, Kazuya, 4,684,992, Cl. 358-213.120.
Ohta, Yoshinori; and Nishizawa, Jun-ichi, 4,684,968, Cl. 357-30.000.
Takada, Katsuhiro, 4,684,221, Cl. 350-413.000.
Yamashita, Nobuo; and Takahashi, Susumu, 4,684,224, Cl. 350-445.000.
Omloo, Hubertus A. A.: *See*—
de Koning, Adrianus J.; Loontjens, Jacobus A.; Mostert, Hubertus A. M.; and Omloo, Hubertus A. A., 4,684,706, Cl. 526-262.000.
Omodeo Zorini, Luigi, to Comez S.p.A. Thread guide rail for crochet galloon machines. 4,683,727, Cl. 66-207.000.
Omron Tateisi Electronics Co.: *See*—
Nanjoh, Hideo, 4,685,035, Cl. 361-429.000.
Omura, Takashi: *See*—
Miyamoto, Tetsuya; Omura, Takashi; Harada, Naoki; and Takeshita, Akira, 4,684,721, Cl. 540-126.000.
Ona, Isao; Ozaki, Masaru; and Fujii, Tadashi, to Toray Silicone Co., Ltd. Organopolysiloxane compounds comprising epoxy-terminated polyoxyalkylene radicals. 4,684,709, Cl. 528-15.000.
Ondetti, Miquel A.; and Pluscec, Josip, to E. R. Squibb & Sons, Inc. Mercaptoacyldepeptides. 4,684,660, Cl. 514-423.000.
O'Neill, Raymond J. Retaining wall construction element. 4,684,294, Cl. 405-286.000.
Ono, Tatsuo; Masuda, Akira; and Kuramoto, Kikuzo, to Nisso Sangyo Co., Ltd. Folding container. 4,684,034, Cl. 220-6.000.
Onodera, Kaoru: *See*—
Nishijima, Toyoki; and Onodera, Kaoru, 4,684,603, Cl. 430-372.000.
Ontario Drive and Gear Limited: *See*—
Smith, Morley L., 4,683,970, Cl. 180-15.000.
Ooi, Katsunori; Hidai, Yutaka; Kurosawa, Yoshiaki; and Nakamura, Yoshikatsu, to Kabushiki Kaisha Toshiba. Method and device for handwritten letter recognition. 4,685,142, Cl. 382-13.000.
Ooishi, Tadashi, to Sumitomo Chemical Company, Limited. Agricultural and horticultural fungicidal composition. 4,684,634, Cl. 514-144.000.
Opalka, Chester J., Jr.: *See*—
Christiansen, Robert G.; Bell, Malcolm R.; Herrmann, John L., Jr.; and Opalka, Chester J., Jr., 4,684,636, Cl. 514-176.000.
Oral-D (L.P.): *See*—
Green, Donald E., 4,684,482, Cl. 260-404.500.
Orbital Research Partners, L.P.: *See*—
Tillman, Christopher D., 4,685,029, Cl. 361-359.000.
Orendorf, Thomas E.: *See*—
Horn, Charles; Kelly, Rickey L.; Orendorf, Thomas E.; and Kiger, Terry L., 4,684,309, Cl. 414-224.000.
Orenstein, Henry. Appendage operated toy. 4,684,354, Cl. 446-130.000.
Orentreich, Norman; and Matias, Jonathan R., to Orentreich, Norman. Compositions and methods for inhibiting the action of androgens. 4,684,635, Cl. 514-170.000.
Osanai, Akinori; Niwa, Takao; and Gono, Takeshi, to Toyota Jidosha Kabushiki Kaisha. Method and apparatus for controlling continuously variable transmission for vehicle. 4,683,779, Cl. 74-861.000.
Oscar Mayer Foods Corporation: *See*—
Jonovic, John A.; Stengel, Bruce W.; and Mally, Timothy G., 4,684,040, Cl. 222-148.000.
Oshima, Hiroyasu: *See*—
Nohmi, Makoto; Miyamoto, Shoji; Takaoka, Tadashi; and Oshima, Hiroyasu, 4,684,859, Cl. 318-317.000.
Oshima, Junji; Yamada, Minoru; and Kajita, Yasuyuki, to Takeda Chemical Industries, Ltd. Flame-retardant, unsaturated polyester resin and composition therefor. 4,684,695, Cl. 525-36.000.
Oshima, Ryoichiro: *See*—
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.
Ossont, Guy H.: *See*—
Plovanich, Charles J.; Ossont, Guy H.; King, Keith C.; Irwin, Robert H.; and Knoop, Walter V., 4,683,814, Cl. 100-37.000.
Ostenak, Carl A.; and Mackay, Harold A., to United States of America, Energy. Hydrofluoric acid-resistant composite window and method for its fabrication. 4,684,217, Cl. 350-319.000.
Osugi, Katsuhisa; Ichinose, Isao; Takahashi, Eisaku; and Arahira, Masato, to Kureha Kagaku Kogyo Kabushiki Kaisha. Derivatives of β-(4-isocyano-1,2,3,4-diepoxycyclopentyl) acrylic acid. 4,684,664, Cl. 514-475.000.
Ota, Etsuo: *See*—
Hayashi, Torahiko; and Ota, Etsuo, 4,684,008, Cl. 198-436.000.
Ota, Takahisa: *See*—
Shikama, Toshihiro; Ota, Takahisa; Ishizaka, Michihiro; Kira, Hirofumi; Horiguchi, Akira; and Kooi, Yuji, 4,685,105, Cl. 370-86.000.
O'Toole, Michael P.: *See*—
Foley, Henry C.; and O'Toole, Michael P., 4,684,618, Cl. 502-313.000.
Otsuka, Akira; Shinoda, Tsutae; Horio, Kenji; and Tanioka, Tsuyoshi, to Fujitsu Limited. Method for driving a gas discharge display panel. 4,684,849, Cl. 315-169.400.
Otsuka Pharmaceutical Company Limited: *See*—
Tone, Hitoshi; Miyamoto, Hisashi; Ueda, Hiraki; and Nakagawa, Kazuyuki, 4,684,648, Cl. 514-249.000.
Otsuki, Toshiaki: *See*—
Kawamura, Hideaki; and Otsuki, Toshiaki, 4,684,861, Cl. 318-567.000.
Ou-Yang, David T., to Minnesota Mining and Manufacturing Company. Polymeric coating for container induction innerseal. 4,684,554, Cl. 428-35.000.
Oude Alink, Bernardus A.: *See*—
Thompson, Neil E. S.; Redmore, Derek; Oude Alink, Bernardus A.; and Outlaw, Benjamin T., 4,684,507, Cl. 422-12.000.
Outlaw, Benjamin T.: *See*—
Thompson, Neil E. S.; Redmore, Derek; Oude Alink, Bernardus A.; and Outlaw, Benjamin T., 4,684,507, Cl. 422-12.000.
Oval Engineering Co., Ltd.: *See*—
Misumi, Masao, 4,683,760, Cl. 73-861.220.

Over, Gary L.: *See*—
Long, William B.; Over, Gary L.; Shaffer, Howard R.; and Shuey, John R., 4,684,192, Cl. 439-374.000.

Owen, Alan E.; Sarrabayrouse, Gerard; LeComber, Peter G.; and Spear, Walter E., to British Petroleum Company, P.L.C., The. Non-volatile amorphous semiconductor memory device utilizing a forming voltage. 4,684,972, Cl. 357-59.000.

Oximetrix, Inc.: *See*—
Goldring, Stanley D., 4,684,245, Cl. 356-41.000.

Oxley, Leslie J., to Ampex Corporation. Method and apparatus for combining multiple video images in three dimensions. 4,684,990, Cl. 358-183.000.

Oy Kontekla: *See*—
Ebeling, Olavi; and Lunden, Risto, 4,683,685, Cl. 52-12.000.

Ozaki, Masaru: *See*—
Ona, Isao; Ozaki, Masaru; and Fujii, Tadashi, 4,684,709, Cl. 528-15.000.

Ozawa, Hiroyasu: *See*—
Tanabe, Hisao; Takahashi, Masaru; Ozawa, Hiroyasu; Machida, Shoichi; and Kitamura, Makoto, 4,683,993, Cl. 188-321.110.

Ozawa, Juichiro, to Susumu Industrial Co., Ltd.; and Thin Film Technology Corporation. Chip resistor. 4,684,916, Cl. 338-308.000.

Ozdemir, Veli. Swimming pool cover. 4,683,686, Cl. 52-64.000.

Ozer, Theodore: *See*—
Douglas, William A.; and Ozer, Theodore, 4,684,113, Cl. 269-21.000.

P/O Tallinsky Electrotekhnichesky Zavod: *See*—
Baraban, Viktor P.; Zabrovsky, Stanislav G.; Zvyagin, Albert F.; Lazarev, Grigory B.; and Tars, Yaak A., 4,685,045, Cl. 363-68.000.

Paar, Willibald; Pampouchidis, Georg; and Honig, Helmut, to Vianova Kunstharz, A.G. Cathodically depositable synthetic resin binders and process for producing same. 4,684,702, Cl. 525-528.000.

Package Control Limited: *See*—
Dickson-Wright, Edward A.; and Lacey, Derick A., 4,684,311, Cl. 414-535.000.

Palaghias, Georgios, to Landstingens Inkopscentral, LIC ek. forening. Method of preventing the occurrence of corrosion of amalgam filling material for dental purposes, and amalgam filling material therefor. 4,684,347, Cl. 433-228.100.

Palazzolo, Faro D.; Drake, Brian L.; and Swanson, Ralph R., to United States of America, Army. Remotely-operated travel lock for vehicle main gun. 4,683,801, Cl. 89-40.120.

Pampouchidis, Georg: *See*—
Paar, Willibald; Pampouchidis, Georg; and Honig, Helmut, 4,684,702, Cl. 525-528.000.

Pankove, Jacques I.; and Wu, Chung P., to RCA Corporation. Silicon light emitting device and a method of making the device. 4,684,964, Cl. 357-17.000.

Paparatto, Giuseppe, to Montedipe S.p.A. Process for the synthesis of phenol. 4,684,749, Cl. 568-797.000.

Paper Chemistry Laboratory, Inc.: *See*—
Penniman, John G.; and Reichlin, Maria S., 4,684,440, Cl. 162-184.000.

Paperno, Steven H.; and Monica, Lisa R. Protective overlay for watch crystal. 4,684,264, Cl. 368-283.000.

Papierfabrik August Koehler AG: *See*—
Pietsch, Gunther; and Hartmann, Claus, 4,684,574, Cl. 428-402.200.

Papp nee Sziklay, Zsofia: *See*—
Nagy, Geza T.; Szepesi, Gabor; Gazdag, Maria; Papp nee Sziklay, Zsofia; and Burger, Kalman, 4,684,638, Cl. 514-185.000.

Papyrus Inc.: *See*—
Ibrahim, Ahmed A., 4,684,441, Cl. 162-198.000.

Par-Pak Limited: *See*—
Ebrahim, Sajjad; and Hexamer, Donald K., 4,684,024, Cl. 206-464.000.

Parent, Yves O.: *See*—
Welsh, William A.; Parent, Yves O.; and Mertz, Stanley A., 4,684,530, Cl. 426-330.400.

Parker Hannifin Corporation: *See*—
Kenyon, Richard L., 4,684,368, Cl. 604-152.000.
Sharp, Bernard C., 4,683,606, Cl. 15-250.420.

Parks, Sydney. Capacitive sensing security system. 4,684,931, Cl. 340-563.000.

Parr, Dennis J.: *See*—
Sardella, Louis M.; West, John B.; Harrison, John R.; and Parr, Dennis J., 4,683,822, Cl. 101-382.0MV.

Parran, John J., Jr.; and Sakkab, Nabil Y., to Procter & Gamble Company, The. Oral compositions. 4,684,518, Cl. 424-52.000.

Parris, David; and Tonner, Steven P., to ICI Australia Limited. Catalyzed process. 4,684,755, Cl. 585-257.000.

Parsons, William H.: *See*—
Chang, Raymond S. L.; and Parsons, William H., 4,684,645, Cl. 514-213.000.

Partin, Dale L.: *See*—
Shu-Ti Lee, Peter; Majkowski, Richard F.; and Partin, Dale L., 4,684,805, Cl. 250-343.000.

Pascal, Roger; and Rullier, Pierre, to Salomon S.A. Ski binding. 4,684,147, Cl. 280-628.000.

Pasco, Wayne D.: *See*—
Charles, Richard J.; Mitoff, Stephan P.; and Pasco, Wayne D., 4,684,446, Cl. 204-15.000.

Pasquale, Antonio: *See*—
Marraccini, Antonio; Carlini, Filippo M.; Pasquale, Antonio; and Pontevivo, Michele, 4,684,408, Cl. 106-300.000.

Passamaneck, Richard S.: *See*—
Hill, Gilman A.; Passamaneck, Richard S.; and Touryan, Kenell J., 4,683,943, Cl. 166-63.000.

Patel, Pravin P.; and Norwood, Roger D., to Texas Instruments Incorporated. High speed, low-power nibble mode circuitry for dynamic memory. 4,685,089, Cl. 365-233.000.

Pathak, Prabodh; and Salter, Stephen J., to Atlantic Richfield Company. Chemical flooding and controlled pressure pulse fracturing process for enhanced hydrocarbon recovery from subterranean formations. 4,683,951, Cl. 166-271.000.

Patin, Henri: *See*—
Bourrelly, Paul; Patin, Henri; Schoepp, Robert; and Sanson, Charles, 4,684,265, Cl. 374-43.000.

Patisaul, Charles R.: *See*—
Adams, William C., Jr.; and Patisaul, Charles R., 4,684,955, Cl. 342-351.000.

Patterson, Thomas C., to Cannondale Corporation. Bicycle shifter boss assembly. 4,684,281, Cl. 403-197.000.

Patykivsky, Bodgan I.: *See*—
Chernikov, Jury L.; Patykivsky, Bodgan I.; and Chernovol, Vladimir A., 4,684,112, Cl. 269-8.000.

Paul, Gary E., to Westinghouse Electric Corp. Guide thimble captured locking tube in a reconstitutable fuel assembly. 4,684,498, Cl. 376-446.000.

Paul Maschinenfabrik GmbH & Co. KG: *See*—
Ryzner, Clemens, 4,683,806, Cl. 92-66.000.

Pauley, James L.: *See*—
Butts, Gene A.; Garsee, Henry A.; Kelley, Charles D.; Petty, Bruce R.; and Pauley, James L., 4,684,244, Cl. 356-39.000.

Pawloski, Curtis H.: *See*—
Rangwala, Badrudden K.; Rodocker, Frank A.; Pawloski, Curtis H.; and Joosten, Richard L., 4,683,701, Cl. 53-167.000.

Payne, Richard S., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Ion implanted CMOS devices. 4,684,971, Cl. 357-42.000.

Pedersen, Daniel E.; and Hatcher, Herbert J., to Ecolab Inc. Two component biocidal process. 4,684,469, Cl. 210-632.000.

PEG Perego-Pines S.p.A.: *See*—
Glaser, Dieter, 4,684,148, Cl. 280-647.000.

Peiffer, Dennis G.; Lundberg, Robert D.; Sedillo, Lawrence; and Newlove, John C., to Exxon Research and Engineering Company. Fluid loss control in oil field cements. 4,683,952, Cl. 166-293.000.

Peitzmeier, Klaus-Dieter: *See*—
Rehbein, Friedhelm; and Peitzmeier, Klaus-Dieter, 4,684,009, Cl. 198-731.000.

Pelton, John T.: *See*—
Hruby, Victor J.; and Pelton, John T., 4,684,620, Cl. 514-11.000.

PEMCO, Inc.: *See*—
Meives, Otis E.; and Lutzke, Anthony, 4,683,705, Cl. 53-462.000.
Vorachek, Michael J.; Entringer, Guy P.; Meives, Otis E.; Lynch, Gary L.; and Lutzke, Anthony J., 4,683,704, Cl. 53-461.000.

Penco, Sergio: *See*—
Bargiotti, Alberto; Caruso, Michele; Suarato, Antonino; Penco, Sergio; and Giuliani, Fernando, 4,684,629, Cl. 514-34.000.

Pennace, John R.; and Quinn, Sharon A., to Flexcon Company, Inc. Silicone pressure-sensitive adhesive laminates and silicone release layers therefore. 4,684,557, Cl. 428-40.000.

Penniman, John G.; and Reichlin, Maria S., to Paper Chemistry Laboratory, Inc. Method for manufacturing paper products. 4,684,440, Cl. 162-184.000.

Penniman, Scott R.: *See*—
Hayman, Eric R.; and Penniman, Scott R., 4,684,154, Cl. 282-29.00R.

Pennison, Robert A., to Dresser Industries, Inc. Safety lever for portable power tool. 4,683,682, Cl. 51-170.00R.

Percec, Elena S.; and Li, George S., to Standard Oil Company. Process for the modification of aromatic polymers via Friedel-Crafts reactions to produce novel polymers and the use thereof. 4,684,376, Cl. 55-16.000.

Pericomp Corp.: *See*—
Joannou, Kyriacos; and Downs, Daniel C., 4,685,013, Cl. 360-121.000.

Periou, Pierre, to Compagnie Industrielle de Mecanismes en abrege C. I. M. Actuating device in particular for a vehicle window glass raising device. 4,683,995, Cl. 192-8.00C.

Perkin-Elmer Corporation, The: *See*—
deMey, Charles F., II, 4,684,811, Cl. 250-561.000.
Ford, Michael A., 4,684,255, Cl. 356-346.000.

Perosino, Alessandro, to Gate S.p.A. Axial fan, particularly for motor vehicles. 4,684,324, Cl. 416-189.000.

Perraudin, Hubert A., to Equipements Automobiles Marchal. Method of cutting a worm screw and a worm screw obtained by the said method. 4,683,785, Cl. 82-1.00C.

Perron, Gilbert: *See*—
Coppens, Christian; Perron, Gilbert; and Pouillard, Jean, 4,685,100, Cl. 370-58.000.

Perry, Charles H.: *See*—
Bezama, Raschid J.; and Perry, Charles H., 4,684,339, Cl. 425-389.000.

Perthus, Peter: *See*—
Loewe, Richard; and Perthus, Peter, 4,685,036, Cl. 362-61.000.

Peters, Erwin, to W. Schlafhorst & Co. Spinning machine. 4,683,712, Cl. 57-81.000.

Peters, Thomas L.; and Stevens, Timothy S., to Dow Chemical Company, The. Apparatus and method for membrane-permeation separations using segmented flow. 4,684,470, Cl. 210-639.000.

Petersen, Alan B.: *See*—
DeBell, Gary W.; Wright, David L.; Ruddock, Kenneth A.; Petersen, Alan B.; Carlson, Lee R.; and von Gunten, Marc K., 4,685,110, Cl. 372-103.000.
Peterson, Carroll T. Locked cover for air condition responsive controller. 4,683,734, Cl. 70-163.000.
Petroleum Fermentations N.V.: *See*—
Hayes, Michael E.; Hrebenar, Kevin R.; Murphy, Patricia L.; Futch, Laurence E., Jr.; Deal, James F., III; and Bolden, Paul L., Jr., 4,684,372, Cl. 44-51.000.
Petrolite Corporation: *See*—
Thompson, Neil E. S.; Redmore, Derek; Oude Alink, Bernardus A.; and Outlaw, Benjamin T., 4,684,507, Cl. 422-12.000.
Petty, Bruce R.: *See*—
Butts, Gene A.; Garsee, Henry A.; Kelley, Charles D.; Petty, Bruce R.; and Pauley, James L., 4,684,244, Cl. 356-39.000.
Peyrot, Jean-Claude; and Bonnard, Jean-Louis, to Preposreve S.A.R.L. Retractable blade knife. 4,683,656, Cl. 30-162.000.
Pfalzgraf, Manfred, to VDO Adolf Schindling AG. System for switching a drive device dependent on speed. 4,683,778, Cl. 74-858.000.
Pfarrsbacher, Alfred: *See*—
Kronawittleithner, Kurt; and Pfarrsbacher, Alfred, 4,683,788, Cl. 82-47.000.
Pfizer Inc.: *See*—
Greengrass, Colin W.; Hoople, David W. T.; and Howarth, Thomas T., 4,684,641, Cl. 514-201.000.
Greengrass, Colin W.; Hoople, David W. T.; and Howarth, Thomas T., 4,684,642, Cl. 514-201.000.
Phalen, Robert F. Tactile affirmative response membrane switch. 4,684,767, Cl. 200-5.00A.
Phillips Petroleum Company: *See*—
Abbe, Bruce W.; and Cole, Jack M., 4,684,472, Cl. 210-720.000.
Drake, Charles A., 4,684,760, Cl. 585-670.000.
Jones, Ronald D.; and Cross, Joseph B., 4,684,041, Cl. 222-161.000.
Phillips, Raymond P., Sr. Apparatus for converting radio frequency energy to direct current. 4,685,047, Cl. 363-126.000.
Philp, Charles W.: *See*—
McDonald, Allen S.; Philp, Charles W.; and Sperakis, Thomas A., 4,684,052, Cl. 228-122.000.
Physical Sciences, Inc.: *See*—
Frish, Michael B.; Nebolsine, Peter E.; and Pirri, Anthony N., 4,684,781, Cl. 219-121.0LU.
Piatt, Clair E.: *See*—
Macemon, Herbert J.; Schlake, Randall L.; Fisher, John L.; Piatt, Clair E.; and Mohney, Hubert L. R., 4,683,919, Cl. 140-92.200.
Piatti, Franco: *See*—
Valsecchi, Carlo; Piatti, Franco; and Bazzi, Giuseppe B., 4,683,620, Cl. 24-71.0SK.
Picht, Brian J.: *See*—
Huffman, John W.; Picht, Brian J.; and Tyson, Ben B., 4,684,273, Cl. 400-247.000.
Picker International, Inc.: *See*—
Furbee, Avery D.; Pleil, Viktor W.; and Burke, James E., 4,685,118, Cl. 378-114.000.
Misic, George J., 4,684,895, Cl. 324-322.000.
Picone, John D.; and Cronauer, Edward A., to United Technologies Corporation. Reset circuit in a magnetic modulator. 4,684,821, Cl. 307-106.000.
Piesik, Edward T., to General Dynamics, Pomona Division. Gas management transition device. 4,683,798, Cl. 89-1.816.
Pietsch, Gunther; and Hartmann, Claus, to Papierfabrik August Koehler AG. Process for encapsulating dissolved reactants of color reaction system and resulting capsules. 4,684,574, Cl. 428-402.200.
Piezo Electric Products, Inc.: *See*—
Murphy, Donald, 4,684,328, Cl. 417-322.000.
Pillage, Lawrence T.; and Anderson, Arthur A., to Westinghouse Electric Corp. Elevator communication controller. 4,683,989, Cl. 187-121.000.
Pillar Technologies, Inc.: *See*—
Collins, Wayne, 4,684,803, Cl. 250-324.000.
Pinkerton, Cletis P.: *See*—
Den Besten, Leroy E.; and Pinkerton, Cletis P., 4,684,176, Cl. 299-91.000.
Pinson, George T., to Boeing Company, The. Pressure gas supply for a missile and the like. 4,684,080, Cl. 244-3.220.
Pirri, Anthony N.: *See*—
Frish, Michael B.; Nebolsine, Peter E.; and Pirri, Anthony N., 4,684,781, Cl. 219-121.0LU.
Pismennaya, Galina: *See*—
Minten, Karl L.; and Pismennaya, Galina, 4,684,560, Cl. 428-131.000.
Pissiotas, Georg: *See*—
Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, 4,684,730, Cl. 544-408.000.
Pitney Bowes Inc.: *See*—
Wellman, Russel E.; and Cuming, Phyllis A., 4,684,271, Cl. 400-241.100.
Pitrat, Alain; and Truchet, Bernard, to Crouzet. Microswitch. 4,684,770, Cl. 200-67.00R.
Piwonka, Thomas S.: *See*—
Cybulsky, Michael; Piwonka, Thomas S.; and Brittain, Virgil R., 4,683,936, Cl. 164-122.100.
Plagge, Joseph A. M., to U.S. Philips Corporation. Power supply circuit. 4,684,871, Cl. 320-21.000.
Plainer, Hermann; Sproessler, Bruno; and Uhlig, Helmut, to Rohm GmbH. Method for making beer. 4,684,525, Cl. 426-16.000.
Pleil, Viktor W.: *See*—
Furbee, Avery D.; Pleil, Viktor W.; and Burke, James E., 4,685,118, Cl. 378-114.000.
Pliefke, Engelbert: *See*—
Schmitt, Klaus; Schoen, Klaus-Peter; Riedel, Peter; Lingnau, Juergen; and Pliefke, Engelbert, 4,684,594, Cl. 430-49.000.
Plies, Erich; and Kuck, Gerd, to Siemens Aktiengesellschaft. Scanning system for a particle beam scanning apparatus. 4,684,808, Cl. 250-396.00R.
Plovanich, Charles J.; Ossont, Guy H.; King, Keith C.; Irwin, Robert H.; and Knoop, Walter V., to Revere Copper and Brass Incorporated. Apparatus and processes for compressing and/or biodigesting material. 4,683,814, Cl. 100-37.000.
Plum, Hans; and Landsiedel, Horst, to Schering Aktiengesellschaft. Biocidal tributyltin compounds. 4,684,663, Cl. 514-493.000.
Plunkett, Allan B.: *See*—
Miller, Timothy J. E.; Plunkett, Allan B.; and Steigerwald, Robert L., 4,684,867, Cl. 318-701.000.
Pluscec, Josip: *See*—
Ondetti, Miquel A.; and Pluscec, Josip, 4,684,660, Cl. 514-423.000.
Pneumo Abex Corporation: *See*—
Bradley, Charles D., Jr., 4,684,284, Cl. 403-320.000.
Dirkin, William; and Feldt, Gary, 4,684,280, Cl. 403-157.000.
Poehler, Theodore O.: *See*—
Potember, Richard S.; and Poehler, Theodore O., 4,684,598, Cl. 430-269.000.
Pohl, Daniel P.: *See*—
LaBrosse, Paul R.; and Pohl, Daniel P., 4,684,552, Cl. 428-4.000.
Pohl, Wolfgang D.: *See*—
Bednorz, Johannes G.; Denk, Winfried; Lanz, Martin; and Pohl, Wolfgang D., 4,684,206, Cl. 350-96.120.
Pohndorf, Peter J., to Cordis Corporation. Suture sleeve anchoring device. 4,683,895, Cl. 128-784.000.
Pokalsky, Peter A.: *See*—
Minasy, Arthur J.; and Pokalsky, Peter A., 4,684,930, Cl. 340-551.000.
Polgreen, Thomas L.: *See*—
Tregilgas, John H.; and Polgreen, Thomas L., 4,684,415, Cl. 437-228.000.
Polska Akademia Nauk-Centrum Baden Molekularnych i Makromolekularnych: *See*—
Stec, Wojciech; Kinas, Ryszard; and Misiura, Konrad, 4,684,742, Cl. 558-81.000.
Polzer, Bernhard; and Roemischer, Johann, to Deutsche Gardner-Denver GmbH. Method of tightening threaded fasteners. 4,685,050, Cl. 364-152.000.
Pontevivo, Michele: *See*—
Marraccini, Antonio; Carlini, Filippo M.; Pasquale, Antonio; and Pontevivo, Michele, 4,684,408, Cl. 106-300.000.
Port, David J.: *See*—
Ritsko, Joseph E.; Port, David J.; and Houck, David L., 4,684,400, Cl. 75-0.5AB.
Portelli, Gene B.: *See*—
Schultz, William J.; Portelli, Gene B.; and Tane, Jeffrey P., 4,684,678, Cl. 523-466.000.
Post, Lothar; and Schneider, Bernhard, to Rheinmetall GmbH. Arrangement for rapidly stopping an automatic weapon having an external drive. 4,683,799. Cl. 89-11.000.
Potember, Richard S.; and Poehler, Theodore O., to Johns Hopkins University, The. Enhanced optically sensitive medium using organic charge transfer materials to provide reproducible thermal/optical erasure. 4,684,598, Cl. 430-269.000.
Potucek, Frank R., to Duo-Fast Corporation. Fastener strip. 4,684,022, Cl. 206-347.000.
Pouillard, Jean: *See*—
Coppens, Christian; Perron, Gilbert; and Pouillard, Jean, 4,685,100, Cl. 370-58.000.
Powell, Jeffrey M., to Liebert Corporation. Power conditioning system and apparatus. 4,684,875, Cl. 323-204.000.
Powell, Jon N., to Thomson Components-Mostek Corp. Method and network for transmitting addressed signal samples from any network input to an addressed network output. 4,685,128, Cl. 379-272.000.
Powers, Dale R.: *See*—
Cavender, Ralston R., Jr.; Connolly, Elizabeth S.; Powers, Dale R.; and Ritter, John E., 4,684,383, Cl. 65-3.120.
Powers, Kerns H., to RCA Corporation. Slow motion television system having variable interlace. 4,685,002, Cl. 360-9.100.
PPG Industries, Inc.: *See*—
Chang, Wen-Hsuan; Blackburn, William P.; Prucnal, Paul J.; and Dufford, Edward L., 4,684,697, Cl. 525-100.000.
Rockar, James A.; and Ignatius, James E., 4,683,693, Cl. 52-198.000.
Schimmel, Karl F.; Ward, Thomas A.; and Seiner, Jerome A., 4,684,710, Cl. 528-26.000.
Prataviera, Giovanni: *See*—
Zago, Giovanni; and Prataviera, Giovanni, 4,685,015, Cl. 360-128.000.
Preposreve S.A.R.L.: *See*—
Peyrot, Jean-Claude; and Bonnard, Jean-Louis, 4,683,656, Cl. 30-162.000.
Pressure Services, Inc.: *See*—
Brewer, Jimmy D.; Gunther, Albert W., Jr.; and Gunther, Albert W., Sr., 4,684,306, Cl. 414-22.000.
Princeton University, The Trustees of: *See*—
Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J.; and Fletcher, Stephen R., 4,684,653, Cl. 514-258.000.

Pro Form, Inc.: *See*—
Dalebout, William T.; Vassoughi, Sohrab; Martinell, William J.; Rohrer, David C.; Martinell, Steven W.; and Marchant, Robert L., 4,684,126, Cl. 272-134.000.

Procter & Gamble Company, The: *See*—
Copland, Donald S.; Halstead, Larry D.; and O'Brien, Lawrence E., 4,684,025, Cl. 206-484.000.
Parran, John J., Jr.; and Sakkab, Nabil Y., 4,684,518, Cl. 424-52.000.

Product Design & Development, Inc.: *See*—
Sterner, Maurice E., Jr., 4,683,676, Cl. 49-181.000.

Product Research and Development: *See*—
Hartley, E. Dale; and Hartley, F. Scott, 4,684,332, Cl. 417-397.000.

Prokop, James A.; and Truehart, David C., to Lull Engineering Company, Inc. Divided flow self-leveling system. 4,683,802, Cl. 91-516.000.

Propper Manufacturing Co., Inc.: *See*—
Schmidt, Otto H.; Heine, Helmut A.; and Rosenbusch, Helmut, 4,684,227, Cl. 351-205.000.

Proprietary Technology, Inc.: *See*—
Bartholomew, Donald D., 4,683,917, Cl. 138-121.000.

Prucnal, Paul J.: *See*—
Chang, Wen-Hsuan; Blackburn, William P.; Prucnal, Paul J.; and Dufford, Edward L., 4,684,697, Cl. 525-100.000.

Prud'Homme, Christian, to Rhone-Poulenc Specialites Chimiques. Selective production of dimethyldichlorosilane. 4,684,741, Cl. 556-472.000.

Pueblo Technologies, Inc.: *See*—
Barnsdale, William J., Jr.; and Ford, Frank G., 4,685,056, Cl. 364-200.000.

Purlia, John M.; and Jankowski, Stephen J. Golf ball cleaner. 4,683,603, Cl. 15-104.940.

Pyzer, Joan B. Toy box with removable covering. 4,683,927, Cl. 150-52.00R.

Quinn, Sharon A.: *See*—
Pennace, John R.; and Quinn, Sharon A., 4,684,557, Cl. 428-40.000.

R. E. Stiftung: *See*—
Graetzel, Michael; Serpone, Nick; and Duonghong, Dung, 4,684,537, Cl. 427-53.100.

R T M Istituto per le Ricerche di Tecnologia Meccanica e per l'Automazione: *See*—
Cantello, Maichi; and Manino, Pier Giuseppe, 4,684,780, Cl. 219-121.0LQ.

Rabinowitz, Lewis. Gum massager. 4,683,875, Cl. 128-62.00A.

Rachocki, Michael J.: *See*—
Weinerman, Lee S.; Rachocki, Michael J.; and Giarrizzo, John E., 4,683,736, Cl. 70-208.000.

Radant Technologies, Inc.: *See*—
Sureau, Jean-Claude; and Krystofik, Steven S., 4,684,954, Cl. 343-909.000.

Radelet, Reginald P.: *See*—
Bergman, Frederick S.; and Radelet, Reginald P., 4,684,031, Cl. 212-179.000.

Radomski, Thomas A., to General Motors Corporation. Motor vehicle electrical system including a combined starter/generator. 4,684,814, Cl. 290-31.000.

Radulski, Charles A.: *See*—
Till, Henry R.; Warner, Fredrick A.; and Radulski, Charles A., 4,684,238, Cl. 355-10.000.

Radyne Limited: *See*—
Eveson, Anthony C., 4,683,742, Cl. 72-43.000.

Raedisch, Helmer: *See*—
Breuer, Kornelia; Gelderie, Udo; Holzer, Gerhard; and Raedisch, Helmer, 4,684,694, Cl. 524-730.000.

Railcar Specialties, Inc.: *See*—
Cummings, Ralph E.; and Brzezinski, Denis R., 4,683,678, Cl. 49-426.000.

Raines, Kenneth C., to Burron Medical Inc. Normally closed automatic reflux valve. 4,683,916, Cl. 137-854.000.

Ralston Purina Company: *See*—
Weber, Frank J., 4,684,058, Cl. 229-17.00R.

Ram Automotive Company: *See*—
Norcia, John A.; Wheatley, William M.; and Norcia, Michael D., 4,683,843, Cl. 123-1.00A.

Randlett, M. Ronald: *See*—
Bower, Terry F.; Randlett, M. Ronald; and Shinopulos, George, 4,683,938, Cl. 164-413.000.

Raney, Richard C.: *See*—
Fisher, Ina E.; and Raney, Richard C., 4,684,810, Cl. 250-515.100.

Rangwala, Badrudden K.; Rodocker, Frank A.; Pawloski, Curtis H.; and Joosten, Richard L., to Ex-Cell-O Corporation. Container sterilization apparatus. 4,683,701, Cl. 53-167.000.

Ranson, Jean-Francois. Intermittently operating pneumatic device for pumping solid-carrying liquids and slurries. 4,684,295, Cl. 406-50.000.

Rapid S.A.: *See*—
Dubost, Dominique, 4,684,305, Cl. 411-174.000.

Rast, Robert M.; and Wreford-Howard, David, to American Television & Communications Corporation. System for controlling communications on a cable television network. 4,684,980, Cl. 358-86.000.

Rattlingourd, Glen D.: *See*—
Miller, Larry J.; Rattlingourd, Glen D.; and Johnson, Clifford T., 4,685,106, Cl. 370-112.000.

Raubach, Manfred: *See*—
Ghibu, Michael; Hartel, Volker; Heynemann, Carl; and Raubach, Manfred, 4,683,979, Cl. 181-286.000.

Raudys, Vytas A., to Viskase Corporation. Disposable tension sleeve for a stuffing machine. 4,683,617, Cl. 17-41.000.

Rauschenberger, Jorg. Joint for use in collapsible chairs and the like. 4,684,278, Cl. 403-84.000.

Ravindhran, Kothandaraman S.; and Kulkarni, Narayan M., to GTE Communication Systems Corp. Method of coding a MOS ROM array. 4,683,641, Cl. 437-41.000.

Rawlinson, Stephen J.: *See*—
Lee, Hsiao-Peng S.; Rawlinson, Stephen J.; and Si, Stephen S., 4,685,058, Cl. 364-200.000.

Raychem Corporation: *See*—
Carlomagno, William D., 4,685,025, Cl. 361-106.000.
Gladfelter, Harry F., 4,684,762, Cl. 174-36.000.
Krevor, David H., 4,685,090, Cl. 367-20.000.
Yaeger, John R., 4,684,913, Cl. 337-140.000.

Raynor, Grace M. Communications process and apparatus. 4,684,348, Cl. 434-156.000.

Rayovac Corporation: *See*—
Van Dyke, Ted J., Jr., 4,684,589, Cl. 429-184.000.

Raytheon Company: *See*—
Edstrom, Carl W.; Fedele, Daniel E.; and Lazar, Martin, 4,684,277, Cl. 400-639.100.
Eves, E. Eugene, II; and Maher, Thomas F., 4,684,777, Cl. 219-10.55A.
Richards, Gerald P.; and Renard, Andre M., 4,684,897, Cl. 328-162.000.
Tajima, Yusuke; and Tsukii, Toshikazu, 4,684,965, Cl. 357-22.000.

RCA Corporation: *See*—
Acampora, Alfonse; and Lu, Chung H., 4,684,983, Cl. 358-135.000.
Armer, John, 4,685,079, Cl. 364-784.000.
Dischert, Robert A.; Ader, Joseph R.; and Topper, Robert J., 4,684,977, Cl. 358-31.000.
Faraone, Lorenzo, 4,683,640, Cl. 437-41.000.
Fuldner, William V.; and Ganssle, Eugene R., 4,684,084, Cl. 244-168.000.
Giordano, Raymond L., 4,684,878, Cl. 323-279.000.
Goodman, Alvin M.; Goodman, Lawrence A.; Russell, John P.; and Robinson, Paul H., 4,684,413, Cl. 437-17.000.
Krufka, Frank S., 4,684,982, Cl. 358-107.000.
Pankove, Jacques I.; and Wu, Chung P., 4,684,964, Cl. 357-17.000.
Powers, Kerns H., 4,685,002, Cl. 360-9.100.
Roeder, Barbara J.; Harwood, Leopold A.; and Weckenbrock, Hermann J., 4,684,989, Cl. 358-167.000.
Sloane, Maurice W.; and Sikina, Thomas V., 4,684,970, Cl. 357-35.000.
Tabak, Andrew, 4,684,888, Cl. 324-207.000.
Wine, Charles M., 4,685,134, Cl. 381-17.000.

Realex Corporation: *See*—
Foster, Donald D.; and Hills, Robert N., 4,684,043, Cl. 222-386.000.
Foster, Donald D., 4,684,044, Cl. 222-386.000.
Foster, Donald D.; and Nelson, Phil L., 4,684,046, Cl. 222-451.000.

Redmore, Derek: *See*—
Thompson, Neil E. S.; Redmore, Derek; Oude Alink, Bernardus A.; and Outlaw, Benjamin T., 4,684,507, Cl. 422-12.000.

Reed, E. Smith, Jr.: *See*—
Ferguson, Robert W.; Andors, Derik K.; and Reed, E. Smith, Jr., 4,683,868, Cl. 126-193.000.

Rehbein, Friedhelm; and Peitzmeier, Klaus-Dieter, to Thiele, August. Two-part scraper for chain conveyors. 4,684,009, Cl. 198-731.000.

Reichardt, Manfred; and Schutzle, Gunter, to Allied Corporation. Plug-in connector and contact element for same. 4,684,197, Cl. 439-404.000.

Reichel, Wolfgang: *See*—
Timmer, Hans H.; and Reichel, Wolfgang, 4,683,941, Cl. 165-47.000.

Reichlin, Maria S.: *See*—
Penniman, John G.; and Reichlin, Maria S., 4,684,440, Cl. 162-184.000.

Reiker, Kenneth H. Ceiling fan mounting assembly. 4,684,092, Cl. 248-200.100.

Reinehr, Dieter: *See*—
Artz, Klaus; Meyer, Hans R.; Reinehr, Dieter; and Weber, Kurt, 4,684,744, Cl. 558-388.000.

Reinforced Earth Company, The: *See*—
Wojciechowski, Longine J., 4,684,287, Cl. 404-6.000.

Reinhold, Klaus. Roll for processing a web or strip of material. 4,683,627, Cl. 29-110.000.

Reinicke, Robert H., to Eaton Corporation. Disposable refill unit for implanted medication infusion device. 4,684,365, Cl. 604-126.000.

Reinmuth, Klaus: *See*—
Lipp, Alfred; Reinmuth, Klaus; and von Struensee, Detlef, 4,684,480, Cl. 252-478.000.

Reitberger, Rudolf: *See*—
Erdt, Wolfgang; Reitberger, Rudolf; and Stocker, Erwin, 4,684,303, Cl. 409-235.000.

Reiter, Norbert: *See*—
Kolaska, Johannes; and Reiter, Norbert, 4,684,405, Cl. 75-240.000.

Reiter, Stuart L., to United Water Resources, Inc. Remotely controlled bypass for automatic watering system. 4,684,920, Cl. 340-310.00A.

Rejs Co., Inc.: *See*—
Barron, Edward J., 4,683,726, Cl. 62-503.000.

Reliability Incorporated: *See*—
Gussman, Robert L., 4,684,182, Cl. 439-68.000.

Remley, Herbert D., to Eastman Kodak Company. Elements having hydrophilic layers containing hydrophobes in polymer particles. 4,684,605, Cl. 430-537.000.

Renard, Andre M.: *See*—
Richards, Gerald P.; and Renard, Andre M., 4,684,897, Cl. 328-162.000.
Renault, Christian L. A.: *See*—
Dubroeucq, Marie-Christine; Le Fur, Gerard R.; and Renault, Christian L. A., 4,684,652, Cl. 514-254.000.
Rengo Co., Ltd.: *See*—
Tokuno, Masateru; and Sawada, Tetsuya, 4,684,360, Cl. 493-367.000.
Rentzea, Costin; Sauter, Hubert; Zeeh, Bernd; Heilen, Gerd; and Jung, Johann, to BASF Aktiengesellschaft. Beta-triazolyl oximes agents containing them for influencing the growth of plants and their use. 4,684,392, Cl. 71-76.000.
Reppel, Paul. Arrangement for record filing. 4,684,028, Cl. 211-51.000.
Repta, Arnold J.; and Mojaverian, Parviz. Method of parenterally delivering drugs and related compositions. 4,684,630, Cl. 514-49.000.
Revere Copper and Brass Incorporated: *See*—
Piovanich, Charles J.; Ossont, Guy H.; King, Keith C.; Irwin, Robert H.; and Knoop, Walter V., 4,683,814, Cl. 100-37.000.
Reyes, Jaime; and Allred, David, to Energy Conversion Devices, Inc. Surface mounted circuits including hybrid circuits, having CVD interconnects, and method of preparing the circuits. 4,685,030, Cl. 361-400.000.
Rheinmetall GmbH: *See*—
Post, Lothar; and Schneider, Bernhard, 4,683,799, Cl. 89-11.000.
Rheon Automatic Machinery Co., Ltd.: *See*—
Hayashi, Torahiko; and Ota, Etsuo, 4,684,008, Cl. 198-436.000.
Rhodes, Joseph C., Jr.; Moore, Victor S.; and Kraft, Wayne R., to International Business Machines Corp. Microword generation mechanism utilizing separate programmable logic arrays for first and second microwords. 4,685,080, Cl. 364-900.000.
Rhodes, Marvin D., to United States of America, National Aeronautics and Space Administration. Preloaded space structural coupling joint. 4,684,156, Cl. 285-27.000.
Rhone-Poulenc Sante: *See*—
Barrere, Genevieve C.; Beydon, Marie-Helene; Drugeault, Lionel; and Vasseur, Jean-Pierre, 4,684,613, Cl. 435-301.000.
Dubroeucq, Marie-Christine; Le Fur, Gerard R.; and Renault, Christian L. A., 4,684,652, Cl. 514-254.000.
Fabre, Jean-Louis; Farge, Daniel; James, Claude; and Lave, Daniel, 4,684,658, Cl. 514-338.000.
Rhone-Poulenc Specialites Chimiques: *See*—
Prud'Homme, Christian, 4,684,741, Cl. 556-472.000.
Ricchio, Dominic A. Distributor for improved water therapy. 4,684,486, Cl. 261-36.100.
Rice, Steven J.; Thompson, Gilbert M.; Dolph, Michael W.; and Montoya, Daniel D., to Adolph Coors Company. Epoxy mixing and dispensing apparatus. 4,684,259, Cl. 366-185.000.
Richard, Thomas J.; and Miller, William H., to Monsanto Company. Preparation of N-substituted amino acids. 4,684,483, Cl. 260-502.50F.
Richard Wolf GmbH: *See*—
Hutterer, Frieder; Buess, Gerd; and Boebel, Manfred, 4,683,885, Cl. 128-334.00R.
Richards, Gerald P.; and Renard, Andre M., to Raytheon Company. Frequency correction apparatus. 4,684,897, Cl. 328-162.000.
Richards, John O.; and Graef, John, to Universal Extension Corporation. Handle extension. 4,683,610, Cl. 16-115.000.
Richardson, Bernard E.: *See*—
Salaman, William; and Richardson, Bernard E., 4,683,796, Cl. 84-380.00C.
Richardson, Truman R., to General Motors Corporation. Warning system for vehicle air dam. 4,683,974, Cl. 180-274.000.
Richman, Jay L., to Allied Corporation. Peltier junction used for thermal control of solid state devices. 4,685,081, Cl. 365-1.000.
Richter Gedeon Vegyeszeti Gyar Rt.: *See*—
Nagy, Geza T.; Szepesi, Gabor; Gazdag, Maria; Papp nee Sziklay, Zsofia; and Burger, Kalman, 4,684,638, Cl. 514-185.000.
Richter, Harald: *See*—
Frei, Urs; Richter, Harald; and Stait, Donald, 4,684,276, Cl. 400-630.000.
Ricoh Company, Ltd.: *See*—
Emoto, Masami; and Inuzuka, Hideo, 4,684,799, Cl. 250-201.000.
Mori, Masaaki; and Okada, Chiharu, 4,684,959, Cl. 346-76.0PH.
Ridgetown Ltd.: *See*—
Break, Douglas, 4,684,300, Cl. 409-134.000.
Ridgley, Brad: *See*—
Tarlow, Kenneth A.; and Ridgley, Brad, 4,683,812, Cl. 99-289.00R.
Riedel, Peter: *See*—
Schmitt, Klaus; Schoen, Klaus-Peter; Riedel, Peter; Lingnau, Juergen; and Pliefke, Engelbert, 4,684,594, Cl. 430-49.000.
Rief, Dieter, to FAHET NV. Automatic pool cleaner fitting. 4,683,599, Cl. 4-490.000.
Righini, Roy. Display stand. 4,684,029, Cl. 211-78.000.
Rijksuniversiteit Leiden: *See*—
Schilperoort, Robbert A.; Krens, Frans A.; and Wullems, George J., 4,684,611, Cl. 435-172.300.
Riker Laboratories, Inc.: *See*—
Leir, Charles M., 4,684,733, Cl. 546-337.000.
Riley, Martin E.: *See*—
Carlson, Lee R.; Hegedus, Denes A.; Jarrett, Steven M.; Miller, Michael F.; Riley, Martin E.; and Wright, David L., 4,685,109, Cl. 372-61.000.
Rinderle, Heinz, to Telefunken Electronic GmbH. Mixer stage. 4,684,833, Cl. 307-525.000.
Ringold, Gordon M.: *See*—
Larrick, James W.; Ringold, Gordon M.; Mark, David F.; Lin, Leo S.; and Torti, Frank M., 4,684,623, Cl. 514-12.000.
Ritsko, Joseph E.; Port, David J.; and Houck, David L., to GTE Products Corporation. Method for controlling the oxygen content in agglomerated molybdenum powders. 4,684,400, Cl. 75-0.5AB.
Ritter, John E.: *See*—
Cavender, Ralston R., Jr.; Connolly, Elizabeth S.; Powers, Dale R.; and Ritter, John E., 4,684,383, Cl. 65-3.120.
Rivoire, Bruno: *See*—
Vigneau, Jean-Louis; Trenque, Pierre; and Rivoire, Bruno, 4,683,905, Cl. 137-329.100.
Robbins Auto Top Co., Inc.: *See*—
Agosta, Roy P., 4,684,419, Cl. 156-93.000.
Robbins, Edward S., Jr. Composite metal and plastic fence and bracket. 4,684,107, Cl. 256-19.000.
Robbins, Max L.: *See*—
Bock, Jan; Brownawell, Darrell W.; Gutierrez, Antonio; Robbins, Max L.; Shaub, Harold; and Steyn, Peter L., 4,684,473, Cl. 252-49.800.
Robert Bosch GmbH: *See*—
Breitkreuz, Helmut; Clement, Albrecht; Mayer, Dieter; Ruppmann, Claus; Walz, Dieter; Wild, Ernst; and Zechnall, Martin, 4,683,861, Cl. 123-520.000.
Hutter, Odo; and Jung, Rainer, 4,684,010, Cl. 198-765.000.
Leroy, Andre; and Flamme, Jean M., 4,683,605, Cl. 15-250.210.
Loewe, Richard; and Perthus, Peter, 4,685,036, Cl. 362-61.000.
Wunsch, Steffen; Zilly, Gunter; and Schneider, Helmut, 4,683,659, Cl. 30-381.000.
Roberts, Durward T., Jr.: *See*—
Bryant, Lynn A.; Roberts, Durward T., Jr.; Beckman, Joseph A.; Tazewell, Joseph H.; and Cetnar, James F., 4,684,420, Cl. 156-116.000.
Robertshaw Controls Company: *See*—
Katchka, Jay R., 4,684,340, Cl. 431-80.000.
Robertson, David W., to Eli Lilly and Company. Anticonvulsant agents. 4,684,748, Cl. 514-619.000.
Robeson, Lloyd M., to Amoco Corporation. Alloys of a poly(arylene sulfide) and a poly(aryl ketone). 4,684,699, Cl. 525-471.000.
Robinson, Paul H.: *See*—
Goodman, Alvin M.; Goodman, Lawrence A.; Russell, John P.; and Robinson, Paul H., 4,684,413, Cl. 437-17.000.
Robinson, Raymond S.: *See*—
Kaufman, Harold R.; and Robinson, Raymond S., 4,684,848, Cl. 315-111.810.
Robison, Arthur E. Saw chain sharpener. 4,683,780, Cl. 76-40.000.
Robison, Robert L.: *See*—
Buddenbaum, Harry C.; and Robison, Robert L., 4,684,643, Cl. 514-204.000.
Rocco, LeRoy E.: *See*—
Light, Gerard M.; Rocco, LeRoy E.; and Clancey, Stephen M., 4,683,999, Cl. 192-58.00B.
Rockar, James A.; and Ignatius, James E., to PPG Industries, Inc. Sloped glazing system. 4,683,693, Cl. 52-198.000.
Rockefeller University, The: *See*—
Kappas, Attallah; and Drummond, George, 4,684,637, Cl. 514-185.000.
Rockett, Paul D.: *See*—
Bird, Charles R.; and Rockett, Paul D., 4,685,119, Cl. 378-130.000.
Rockwell International Corporation: *See*—
Hunt, Eugene V.; Mosley, Charles G.; and Wheatley, Charles E., III, 4,684,903, Cl. 331-78.000.
Smith, Dale K.; Donich, Thomas G.; Dickerson, Bobby V.; and Leader, Raymond E., 4,685,149, Cl. 455-56.000.
Spence, John R., 4,685,085, Cl. 365-190.000.
Rodocker, Frank A.: *See*—
Rangwala, Badrudden K.; Rodocker, Frank A.; Pawloski, Curtis H.; and Joosten, Richard L., 4,683,701, Cl. 53-167.000.
Roeder, Barbara J.; Harwood, Leopold A.; and Weckenbrock, Hermann J., to RCA Corporation. Signal background noise detector. 4,684,989, Cl. 358-167.000.
Roedseth, John K., to Goodyear Tire & Rubber Company, The. Transfer apparatus for tire carcasses and tire bands. 4,684,422, Cl. 156-126.000.
Roemischer, Johann: *See*—
Polzer, Bernhard; and Roemischer, Johann, 4,685,050, Cl. 364-152.000.
Roessler, Peter: *See*—
Mohring, Edgar; Muller, Hanns P.; Roessler, Peter; Wagner, Kuno; and Tietz, Helmut, 4,684,728, Cl. 544-182.000.
Rogers, Kermett A. Anti-theft apparatus for a riding saddle. 4,683,729, Cl. 70-58.000.
Rogers, Richard B.; and Goring, Cleve A. I., to Dow Chemical Company, The. Herbicidal aryloxyphenoxyalkanoate and alkenoate derivatives, compositions, and method of use therefor. 4,684,394, Cl. 71-90.000.
Rohm GmbH: *See*—
Plainer, Hermann; Sproessler, Bruno; and Uhlig, Helmut, 4,684,525, Cl. 426-16.000.
Rohrer, David C.: *See*—
Dalebout, William T.; Vassoughi, Sohrab; Martinell, William J.; Rohrer, David C.; Martinell, Steven W.; and Marchant, Robert L., 4,684,126, Cl. 272-134.000.
Rohrle, Josef, to Siemens Aktiengesellschaft. Control apparatus for a multiple-axis machine tool. 4,684,862, Cl. 318-568.000.

Rollin, Carl; and Rufenacht, Hanspeter, to BTA Boden-Technik AG. Support device and wall for a cable duct in a cavity lining floor. 4,683,690, Cl. 52-126.200.

Rolls-Royce plc: *See*—
Arnold, Hubert E., 4,684,325, Cl. 416-215.000.
Clifford, Rodney J.; and Charters, Ian J., 4,684,322, Cl. 416-95.000.
Wright, William B.; and Flatman, Richard J., 4,683,716, Cl. 60-226.100.

Romeas, Rene, to Alcatel Thomson Gigadisc, SA. Optical disk with pre-recorded marker pattern. 4,685,096, Cl. 369-44.000.

Romeo, Francoise; and Joly, Pascale. Machine for the reading, processing and compression of documents. 4,684,997, Cl. 358-263.000.

Roos, Aage V., to Santrade Limited. Drill. 4,684,298, Cl. 408-59.000.

Rosenbusch, Helmut: *See*—
Schmidt, Otto H.; Heine, Helmut A.; and Rosenbusch, Helmut, 4,684,227, Cl. 351-205.000.

Rosman, Morris. Method of making a two-section bakery container. 4,683,703, Cl. 53-456.000.

Ross, Barry C.: *See*—
Cooke, Michael D.; and Ross, Barry C., 4,684,640, Cl. 514-195.000.

Ross, Dennis: *See*—
Fife, Robert M.; Ross, Dennis; and Shaw, Richard F., 4,685,031, Cl. 361-413.000.

Roth, Arthur A.: *See*—
Rudy, Michael; Cary, Paul; Anderson, Gary S.; and Roth, Arthur A., 4,685,095, Cl. 369-36.000.

Roth, Craig A.: *See*—
Armer, Leon N., Jr.; Antonio, Joseph M.; Roth, Craig A.; and VerWeire, James R., 4,684,137, Cl. 273-428.000.

Roudenko, Vladimir: *See*—
Blomstedt, John W.; Yoshida, Paul S.; Irving, Wesley F.; and Roudenko, Vladimir, 4,685,032, Cl. 361-412.000.

Roy, Jehan; and Dubois, Jean, to Lacoste, SA. Folding wheelchair. 4,684,171, Cl. 297-47.000.

Rozsa, Istvan K. Above ground—below ground pump apparatus. 4,683,945, Cl. 166-68.500.

Ruddock, Kenneth A.: *See*—
DeBell, Gary W.; Wright, David L.; Ruddock, Kenneth A.; Petersen, Alan B.; Carlson, Lee R.; and von Gunten, Marc K., 4,685,110, Cl. 372-103.000.

Rudell, Elliot A. Game with tether straps. 4,684,127, Cl. 273-1.00G.

Rudolph, Joachim, to Werner & Pfleiderer. Method and apparatus for controlled supply of color concentrates into an extruder to obtain a plastic product of desired coloration. 4,684,488, Cl. 264-40.200.

Rudy, Michael; Cary, Paul; Anderson, Gary S.; and Roth, Arthur A., to Filenet Corporation. Optical storage and retrieval device. 4,685,095, Cl. 369-36.000.

Rudy, William J., Jr.; and Wycheck, Thomas H., to AMP Incorporated. Retention article for electrical contacts. 4,684,187, Cl. 439-600.000.

Rueb, Fritz A. Toothbrush with exchangeable bristle carrier. 4,683,604, Cl. 15-176.000.

Rufenacht, Hanspeter: *See*—
Rollin, Carl; and Rufenacht, Hanspeter, 4,683,690, Cl. 52-126.200.

Ruhrchemie Aktiengesellschaft: *See*—
Kessen, Gunther; Cornils, Boy; Gick, Wilhelm; Wiebus, Ernst; Hibbel, Joseph; Bach, Hanswilhelm; and Zgorzelski, Wolfgang, 4,684,750, Cl. 568-883.000.

Rullier, Pierre: *See*—
Pascal, Roger; and Rullier, Pierre, 4,684,147, Cl. 280-628.000.

Ruppmann, Claus: *See*—
Breitkreuz, Helmut; Clement, Albrecht; Mayer, Dieter; Ruppmann, Claus; Walz, Dieter; Wild, Ernst; and Zechnall, Martin, 4,683,861, Cl. 123-520.000.

Rusnock, Kevin R., to Adolph Coors Company. Carton carrying handle. 4,684,059, Cl. 229-52.00B.

Russ, Peter J., III. Grinding wheel with balancing ring. 4,683,681, Cl. 51-169.000.

Russell, James P.: *See*—
Buchar, Wayne A.; and Russell, James P., 4,684,237, Cl. 355-8.000.

Russell, John P.: *See*—
Goodman, Alvin M.; Goodman, Lawrence A.; Russell, John P.; and Robinson, Paul H., 4,684,413, Cl. 437-17.000.

Russell, Larry R. Method and apparatus for operating multiple tools in a well. 4,683,956, Cl. 166-383.000.

Rutschle, Eugen: *See*—
Winkler, Hans-Henning; and Rutschle, Eugen, 4,683,638, Cl. 29-568.000.

Ryckman, William D.; and Gordon, Walter H., to Black & Decker, Inc. Electric toaster oven control. 4,684,788, Cl. 219-413.000.

Rylatt, John A., to Westinghouse Electric Corp. Nozzle seal retaining assembly and positioning assembly therefor. 4,684,491, Cl. 376-203.000.

Ryzner, Clemens, to Paul Maschinenfabrik GmbH & Co. KG. Piston guide for hollow piston of a radial piston engine. 4,683,806, Cl. 92-66.000.

Sachs, Klaus, to Anton Piller GmbH & Co. KG. 400 Hz aircraft ground power supply. 4,684,825, Cl. 307-328.000.

Sackmann, Karl H.; and Anselment, Christoph, to Erwin Sick GmbH Optik-Electronik. Resilient sectional strip for mounting to a closure edge. 4,684,768, Cl. 200-61.430.

Sadek, Kadry: *See*—
Weibelzahl, Manfred; Wild, Georg; and Sadek, Kadry, 4,685,044, Cl. 363-51.000.

Saeli, John J.: *See*—
Brockway, Charles E.; and Saeli, John J., 4,684,344, Cl. 433-81.000.

Sagawa, Masato: *See*—
Matsuura, Yutaka; Sagawa, Masato; and Fujimura, Setsuo, 4,684,406, Cl. 75-244.000.

Sagusa, Hisayuki: *See*—
Makiguchi, Kyoko; Sagusa, Hisayuki; and Nomura, Yasushi, 4,684,252, Cl. 356-328.000.

Sahlgren, Anders; Gustafsson, Rolf; Goransson, Bo; and Sundqvist, Yngve, to Aktiebolaget SKF. Roller bearing cage. 4,684,268, Cl. 384-574.000.

Saint-Gobain Vitrage: *See*—
Breuer, Kornelia; Gelderie, Udo; Holzer, Gerhard; and Raedisch, Helmer, 4,684,694, Cl. 524-730.000.

Saito, Hitoshi: *See*—
Inou, Kiyoharu; and Saito, Hitoshi, 4,685,039, Cl. 363-16.000.

Saito, Michio: *See*—
Sakai, Yasushi; Tanaka, Koji; Saito, Michio; and Kiyohara, Akio, 4,684,711, Cl. 528-86.000.

Saito, Susumu: *See*—
Yamamoto, Fumio; Suzuki, Takayoshi; Ikari, Masahiro; Saito, Susumu; Ohmori, Akira; and Yasuhara, Takashi, 4,684,705, Cl. 526-246.000.

Saito, Yoshio: *See*—
Seshimoto, Osamu; Nirasawa, Mituharu; Terashima, Masaaki; and Saito, Yoshio, 4,684,445, Cl. 204-1.00T.

Saito, Yukio: *See*—
Shimaoka, Motohiro; and Saito, Yukio, 4,685,011, Cl. 360-97.000.

Saitoo, Harunobu: *See*—
Hanazono, Masanobu; Hara, Shinichi; Akiyama, Hirosi; Hayashi, Masaaki; Saitoo, Harunobu; and Kurisu, Takumi, 4,685,014, Cl. 360-126.000.

Sakaguchi, Yoichi: *See*—
Ohtsuga, Hisao; Morinaga, Akio; Sakaguchi, Yoichi; Hyodo, Masakatsu; and Yagi, Isaburo, 4,684,556, Cl. 428-36.000.

Sakai, Yasushi; Tanaka, Koji; Saito, Michio; and Kiyohara, Akio, to Toyo Soda Manufacturing Co., Ltd. Process for producing a hydrocarbon resin. 4,684,711, Cl. 528-86.000.

Sakakibara, Kenji; Harano, Tetsuo; Bandai, Yasuhito; and Ohta, Eiichi, to Brother Kogyo Kabushiki Kaisha. Image reader. 4,684,999, Cl. 358-294.000.

Sakamaki, Yoshio: *See*—
Watanabe, Nobuhisa; Iwamoto, Hisao; Nasuno, Toshihiro; and Sakamaki, Yoshio, 4,684,017, Cl. 206-235.000.

Sakamoto, Kenichiro: *See*—
Minematsu, Yoshihiko; Tanaka, Minoru; Yamamoto, Masayuki; and Sakamoto, Kenichiro, 4,684,313, Cl. 414-735.000.

Sakamoto, Sunji: *See*—
Taketani, Toshinobu; Kuramori, Ken; Sakamoto, Sunji; and Fujii, Hiroshi, 4,683,651, Cl. 29-786.000.

Sakashita, Shigeo, to Casio Computer Co., Ltd. Automatic music playing apparatus capable of producing a plurality of different sounds simultaneously. 4,683,794, Cl. 84-1.030.

Sakata, Masataka; Takasu, Shigeo; and Ikimi, Yoshihiro, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Hydraulic power piping unit for a lift truck. 4,683,987, Cl. 187-9.00E.

Sakkab, Nabil Y.: *See*—
Parran, John J., Jr.; and Sakkab, Nabil Y., 4,684,518, Cl. 424-52.000.

Sakota, Kazuyuki: *See*—
Ueno, Ryuzo; Sakota, Kazuyuki; and Nakamura, Yasunori, 4,684,712, Cl. 528-190.000.

Sakurai, Yoshiyuki, to Seiko Epson Kabushiki Kaisha. Print element, printer and method of printing. 4,684,270, Cl. 400-121.000.

Selaman, William; and Richardson, Bernard E. Mouthpieces for musical wind instruments. 4,683,796, Cl. 84-380.00C.

Sale, Robert F.; and Wells, Wayne E., to Ford Motor Company. Leaf spring clamp with attachment means. 4,684,110, Cl. 267-52.000.

Salesky, William J.: *See*—
Kar, Nareshchandra J.; Salesky, William J.; and Guzowski, Steven J., 4,683,781, Cl. 76-108.00A.

Salmon, Michael E., to Murphy, Thomas. Adjustable pedal assembly. 4,683,977, Cl. 180-334.000.

Salmon, Stuart C. Grinding and dressing wheel support and release apparatus. 4,683,679, Cl. 51-5.00D.

Salomon S.A.: *See*—
Pascal, Roger; and Rullier, Pierre, 4,684,147, Cl. 280-628.000.

Salsness, Arthur H. Gate latch. 4,683,934, Cl. 160-328.000.

Salter, Stephen J.: *See*—
Pathak, Prabodh; and Salter, Stephen J., 4,683,951, Cl. 166-271.000.

Salvarezza, Robert M. Molded hard elastomer steps and replacement and spreader steps for rope ladders and fittings therefor, as well as molding method therefor. 4,683,981, Cl. 182-199.000.

Salvet, Miroslav: *See*—
Krovak, Premysl; and Salvet, Miroslav, 4,684,614, Cl. 435-316.000.

Salvi, Francisco J. Closure for a cooking oven. 4,683,871, Cl. 126-340.000.

Salzgitter Maschinen und Anlagen Aktiengesellschaft: *See*—
Neuhauser, Johannn; and Brauch, Hans-Joachim, 4,683,764, Cl. 74-41.000.

Samek, Norbert E., to IMO Delaval Inc. Biaxial strain gage systems. 4,683,755, Cl. 73-727.000.

Sammells, Anthony F., to Eltron Research, Inc. Solvated electron lithium electrode for high energy density battery. 4,684,590, Cl. 429-194.000.

Samsung Electronics Co., Ltd.: *See*—
Min, Seong K.; Kim, Yong J.; Lee, Hee W.; and Chun, Chul G., 4,685,009, Cl. 360-95.000.

Sanden Corporation: *See*—
Igusa, Masaru; and Nakai, Masayoshi, 4,683,666, Cl. 34-67.000.
Sander, Wilfried: *See*—
Wacker, Erich; Landau, Ulrich; Sander, Wilfried; and Schellmann, Klaus, 4,683,808, Cl. 92-208.000.
Sanderford, Hugh B., Jr., to DDRS, Inc. Electronic lock with secure backdoor access. 4,684,945, Cl. 340-825.560.
Sanders, Gary G., to Scott & Fetzer Company, The. Low voltage direct current power supply. 4,685,046, Cl. 363-89.000.
Sanders, Walter J., to American Standard Inc. Pulse train presence detector. 4,685,052, Cl. 364-426.000.
Sandman, Daniel J.: *See*—
Thakur, Mrinal K.; Tripathy, Sukant K.; and Sandman, Daniel J., 4,684,434, Cl. 156-622.000.
Sandoz Ltd.: *See*—
Stuetz, Anton, 4,684,661, Cl. 514-443.000.
Sandvig, Timothy C.: *See*—
Ersfeld, Dean A.; Sandvig, Timothy C.; and Gobran, Diane S., 4,683,877, Cl. 128-90.000.
Sanglier, Jean-Francois, to U.S. Philips Corporation. Connecting and communication system and means for a telephone station with peripheral apparatus. 4,685,121, Cl. 379-90.000.
Sankey, Edwin W., to Dresser Industries, Inc. Method and apparatus for adding additional D.C. motors and control thereof. 4,684,854, Cl. 318-140.000.
Sanshin: *See*—
Takayasu, Hidekazu, 4,683,846, Cl. 123-73.00A.
Sanson, Charles: *See*—
Bourrelly, Paul; Patin, Henri; Schoepp, Robert; and Sanson, Charles, 4,684,265, Cl. 374-43.000.
Santrade Limited: *See*—
Roos, Aage V., 4,684,298, Cl. 408-59.000.
Sanyo Electric Co., Ltd.: *See*—
Kohmoto, Yujiro; and Tanimoto, Yoshihiro, 4,684,235, Cl. 355-3.00R.
Sarauer, Alan J. Vehicle frame measurement device. 4,683,663, Cl. 33-288.000.
Sardella, Louis M.; West, John B.; Harrison, John R.; and Parr, Dennis J., to Ward Machinery Company, The. Die mounting apparatus. 4,683,822, Cl. 101-382.0MV.
Sarginger, Francis E.: *See*—
Evans, Alfred J.; and Sarginger, Francis E., 4,683,700, Cl. 53-138.00R.
Sarrabayrouse, Gerard: *See*—
Owen, Alan E.; Sarrabayrouse, Gerard; LeComber, Peter G.; and Spear, Walter E., 4,684,972, Cl. 357-59.000.
Sartorelli, Alan C.; and Shyam, Krishnamurthy, to Yale University. N,N'-bis(sulfonyl)hydrazines having antineoplastic activity. 4,684,747, Cl. 564-081.000.
Sasaki, Hitoshi; and Igota, Shoji, to Ajinomoto Co., Inc. Transparent plastic can. 4,684,553, Cl. 428-35.000.
Sasaki, Shoji, to Toyota Jidosha Kabushiki Kaisha. Turbocharger with variable nozzle mechanism. 4,684,319, Cl. 415-164.000.
Sasaki, Toshiki: *See*—
Nakamura, Chiaki; Oe, Kouji; Muta, Tomonobu; and Sasaki, Toshiki, 4,684,601, Cl. 430-284.000.
Sasaki, Yoshiyuki; and Kasaoka, Katsuyuki, to Teijin Limited. Polyester yarn and fabric made of the same. 4,684,566, Cl. 428-224.000.
Sato, Isao: *See*—
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.
Sato, Kazuhiko: *See*—
Hirakawa, Norishige; Okada, Kazuo; and Sato, Kazuhiko, 4,684,333, Cl. 417-420.000.
Sato, Kazuo, to Alps Electric Co., Ltd. Magnetic recording-reproducing device. 4,685,006, Cl. 360-64.000.
Sato Kogyo Co., Ltd.: *See*—
Funakawa, Naoyoshi; Demura, Hajime; and Nagamori, Nobuyuki, 4,684,297, Cl. 407-41.000.
Sato, Yasunori. Two-wheeled vehicle with hydraulic transmission. 4,684,143, Cl. 280-216.000.
Sato, Yoshihisa; Kinugawa, Masumi; Akiyama, Susumu; Yamada, Toshitaka; Mizuno, Tiaki; and Suzuki, Atsushi, to Nippondenso Co., Ltd. Apparatus for controlling engine. 4,683,858, Cl. 123-486.000.
Satoh, Kenji; Kaneshige, Isao; and Ikari, Kyoichiro, to Kuraray Co., Ltd. Heat-laminating composite film and laminated material using the same. 4,684,564, Cl. 428-216.000.
Saurer-Allma GmbH: *See*—
Krause, Ludwig, 4,684,115, Cl. 269-136.000.
Sauter, Hubert: *See*—
Rentzea, Costin; Sauter, Hubert; Zeeh, Bernd; Heilen, Gerd; and Jung, Johann, 4,684,392, Cl. 71-76.000.
Sawada, Tetsuya: *See*—
Tokuno, Masateru; and Sawada, Tetsuya, 4,684,360, Cl. 493-367.000.
Sawaya, Showhachi: *See*—
Masumoto, Hakaru; Sawaya, Showhachi; and Hinai, Masakatsu, 4,684,414, Cl. 148-11.50R.
Sawtek, Inc.: *See*—
Gore, John G., 4,684,783, Cl. 219-210.000.
Sawyer, Philip N.; and Fitzgerald, Joseph F., to Interface Biomedical Laboratories Corporation. Safety arrangement for preventing air embolism during intravenous procedures. 4,684,364, Cl. 604-123.000.
Sbalchiero, Carlo; and Giorgio, Brazzale, to Burr Oak Tool & Gauge Co. Device for assembling return bend to coil. 4,683,649, Cl. 29-726.000.
Scangraphic Dr. Boger GmbH: *See*—
Holthusen, Bernd, 4,684,228, Cl. 354-4.000.
Scanoptics Oy: *See*—
Lindblom, Karl P. C.; and Engman, Sonja A., 4,684,253, Cl. 356-333.000.
Schaefer, Edward J.; and George, Kenneth D., to Franklin Electric Co., Inc. Electric submersible motor with dual snap ring clamp. 4,684,837, Cl. 310-87.000.
Schaffer, Irving; and Emmerich, Claude L., to Meditec Research Associates. Ambulatory intravenous delivery system. 4,684,367, Cl. 604-140.000.
Schellmann, Klaus: *See*—
Wacker, Erich; Landau, Ulrich; Sander, Wilfried; and Schellmann, Klaus, 4,683,808, Cl. 92-208.000.
Schemmann, Hugo: *See*—
Bertram, Leo; and Schemmann, Hugo, 4,684,840, Cl. 310-162.000.
Schen, Michael A.: *See*—
Brown, James W.; Chen, Tsang J.; and Schen, Michael A., 4,684,608, Cl. 430-629.000.
Schenach, Thomas A.: *See*—
Vataru, Marcel; and Schenach, Thomas A., 4,684,373, Cl. 44-63.000.
Schering Aktiengesellschaft: *See*—
Plum, Hans; and Landsiedel, Horst, 4,684,663, Cl. 514-493.000.
Schering Corporation: *See*—
Blythin, David J.; and Shue, Ho-Jane, 4,684,727, Cl. 544-127.000.
Schiessler, Siegfried; and Spietschka, Ernst, to Hoechst Aktiengesellschaft. Process for preparing 1,3,6,8-tetrabromopyrene. 4,684,753, Cl. 570-206.000.
Schiller, Michael, to Fingermatrix, Inc. Conversion of an image represented by a field of pixels in a gray scale to a field of pixels in binary scale. 4,685,145, Cl. 382-52.000.
Schilperoort, Robbert: *See*—
Schilperoort, Robbert A.; Krens, Frans A.; and Wullems, George J., 4,684,611, Cl. 435-172.300.
Schilperoort, Robbert A.; Krens, Frans A.; and Wullems, George J., to Rijksuniversiteit Leiden; and Schilperoort, Robbert. Process for the in-vitro transformation of plant protoplasts with plasmid DNA. 4,684,611, Cl. 435-172.300.
Schimmel, Karl F.; Ward, Thomas A.; and Seiner, Jerome A., to PPG Industries, Inc. Half-amide reaction products of dioxalates and amino group containing materials. 4,684,710, Cl. 528-26.000.
Schine, Jonathan M. Enhanced data display system. 4,684,937, Cl. 340-728.000.
Schirmer, Henry G.: *See*—
Mueller, Walter B.; and Schirmer, Henry G., 4,684,573, Cl. 428-349.000.
Schitinin, Valery E.: *See*—
Akopov, Ernest M.; Schitinin, Valery E.; and Arapova, Anna V., 4,684,051, Cl. 227-19.000.
Schlake, Randall L.: *See*—
Macemon, Herbert J.; Schlake, Randall L.; Fisher, John L.; Piatt, Clair E.; and Mohney, Hubert L. R., 4,683,919, Cl. 140-92.200.
Schlaps, Edgar H.: *See*—
Booth, Thomas L.; Schlaps, Edgar H.; and Wilde, Ronald J., 4,683,975, Cl. 180-289.000.
Haag, Ronald H.; and Schlaps, Edgar H., 4,684,819, Cl. 307-10.00R.
Schlumberger Technology Corporation: *See*—
Dumont, Alain, 4,685,092, Cl. 367-35.000.
Schmid, Hans-Rainer: *See*—
Meinecke, Albrecht; Schmid, Hans-Rainer; and Egelhof, Dieter, 4,684,444, Cl. 162-380.000.
Schmidt, Otto H.; Heine, Helmut A.; and Rosenbusch, Helmut, to Propper Manufacturing Co., Inc.; and Heine Optotecnik GmbH & Co. KG. Binocular indirect ophthalmoscope. 4,684,227, Cl. 351-205.000.
Schmitt, Klaus; Schoen, Klaus-Peter; Riedel, Peter; Lingnau, Juergen; and Pliefke, Engelbert, to Hoechst Aktiengesellschaft. Electrophotographic process for preparing printing forms using alkaline decoater solution. 4,684,594, Cl. 430-49.000.
Schneider, Bernhard: *See*—
Post, Lothar; and Schneider, Bernhard, 4,683,799, Cl. 89-11.000.
Schneider, Helmut: *See*—
Wunsch, Steffen; Zilly, Gunter; and Schneider, Helmut, 4,683,659, Cl. 30-381.000.
Schneider, Philip H.: *See*—
Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., 4,684,321, Cl. 415-202.000.
Schneider, Thomas C., to Velten & Pulver, Inc. Conveyor rollers with traction O-rings and conveyor including same. 4,684,011, Cl. 198-779.000.
Schnelle, Joseph W.: *See*—
French, Daniel B.; Brookshire, Richard E.; and Schnelle, Joseph W., 4,685,067, Cl. 364-513.000.
Schoch, Reinhold: *See*—
Darda, Helmut; and Schoch, Reinhold, 4,683,986, Cl. 185-39.000.
Schoen, Klaus-Peter: *See*—
Schmitt, Klaus; Schoen, Klaus-Peter; Riedel, Peter; Lingnau, Juergen; and Pliefke, Engelbert, 4,684,594, Cl. 430-49.000.
Schoepp, Robert: *See*—
Bourrelly, Paul; Patin, Henri; Schoepp, Robert; and Sanson, Charles, 4,684,265, Cl. 374-43.000.

Schoeps, Knut C., to Atlas Copco Aktiebolag. Hydraulic torque impulse motor. 4,683,961, Cl. 173-93.000.

Schofield, Brooks L., Jr.: *See*—
Adams, Victor J.; and Schofield, Brooks L., Jr., 4,683,757, Cl. 73-756.000.

Scholten, Gerard J.; Beurskens, Theodorus J. G.; and Videc, Mathias F., to U.S. Philips Corporation. Method of and device for sensing the presence or absence of an article at the end of a vacuum pick-up means. 4,683,654, Cl. 29-832.000.

Schonemann, Joachim, to Walzen-Irle GmbH. Heatable calender roller. 4,683,628, Cl. 29-116.00R.

Schorman, Eric R.: *See*—
Smith, Paul F.; Schorman, Eric R.; and Burke, Timothy M., 4,684,941, Cl. 340-825.520.

Schreinemakers, Josephus. Impression tray for a dentate human jaw. 4,684,343, Cl. 433-214.000.

Schultz, George A. Synchronized press for bakery products. 4,683,813, Cl. 99-353.000.

Schultz, Peter G., to Eastman Kodak Company. Magnetic fluid cleaning station. 4,684,242, Cl. 355-15.000.

Schultz, William J.; Portelli, Gene B.; and Tane, Jeffrey P., to Minnesota Mining and Manufacturing Company. Epoxy resin curing agent, process, and composition. 4,684,678, Cl. 523-466.000.

Schulz, Volker; Leyck, Sigurd; Durr, Manfred; Ghyczy, Miklos; Wendel, Armin; and Hager, Jorg, to A. Nattermann & CIE. GmbH. Formulation with special 1,2-diacylglycero-3-phosphocholines for the treatment of gastrointestinal disorders. 4,684,632, Cl. 514-78.000.

Schulze, Harry O., to GTE Products Corporation. Coated pigmented phosphors and process for producing same. 4,684,540, Cl. 427-71.000.

Schurr, Volker, to Andreas Stihl. Chain saw having a braking arrangement. 4,683,660, Cl. 30-382.000.

Schurter, Rolf: *See*—
Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, 4,684,730, Cl. 544-408.000.

Schutzle, Gunter: *See*—
Reichardt, Manfred; and Schutzle, Gunter, 4,684,197, Cl. 439-404.000.

Schwindt, Jurgen: *See*—
Stahl, Hans G.; Hohlein, Peter; Traenckner, Hans-Joachim; Fleiter, Lothar; and Schwindt, Jurgen, 4,684,691, Cl. 524-534.000.

Scott, Bruce A.: *See*—
Jasinski, Joseph M.; Meyerson, Bernard S.; and Scott, Bruce A., 4,684,542, Cl. 437-245.000.

Scott & Fetzer Company, The: *See*—
Lackner, John R.; and Bartasevich, William E., Jr., 4,683,607, Cl. 15-323.000.
Sanders, Gary G., 4,685,046, Cl. 363-89.000.

Scott, William A., to Tillotson, Ltd. Carburetor fuel primer. 4,684,485, Cl. 261-35.000.

Secure Images Inc.: *See*—
Wicker, Ralph C., 4,684,593, Cl. 430-6.000.

Sedillo, Lawrence: *See*—
Peiffer, Dennis G.; Lundberg, Robert D.; Sedillo, Lawrence; and Newlove, John C., 4,683,952, Cl. 166-293.000.

Sedillot, Francois G.: *See*—
Danguy des Deserts, Loic M. J.; Michel, Dominique; and Sedillot, Francois G., 4,684,292, Cl. 405-202.000.

Segal, Henry P.; and Dewilde, Carl, to Siemens Aktiengesellschaft. Digital multiplexer for PCM voice channels having a cross-connect capability. 4,685,101, Cl. 370-84.000.

Seiko Epson Kabushiki Kaisha: *See*—
Hayashi, Seiichi; Takei, Katsumori; and Yamaguchi, Yoshitaka, 4,684,563, Cl. 428-207.000.
Mikoshiba, Hitoshi, 4,683,819, Cl. 101-93.220.
Naka, Takahiro, 4,684,963, Cl. 346-140.00R.
Nishiwaki, Tsutomu, 4,684,960, Cl. 346-76.0PH.
Sakurai, Yoshiyuki, 4,684,270, Cl. 400-121.000.
Shionozaki, Yoshio; Mukai, Hiroshi; Obikawa, Tsuyoshi; and Yamada, Shuhei, 4,684,220, Cl. 350-350.00R.

Seiner, Jerome A.: *See*—
Schimmel, Karl F.; Ward, Thomas A.; and Seiner, Jerome A., 4,684,710, Cl. 528-26.000.

Seitetsu Kagaku Co., Ltd.: *See*—
Haruna, Kazuo; Ueda, Kanji; and Uno, Masaru, 4,684,377, Cl. 55-26.000.

Seki, Hisazi: *See*—
Handa, Takayuki; Takeuchi, Yasushi; Kato, Masumi; and Seki, Hisazi, 4,684,430, Cl. 156-366.000.

Sekiguchi, Shigemi: *See*—
Ezure, Tadayoshi; and Sekiguchi, Shigemi, 4,684,199, Cl. 439-610.000.

Sekine, Hisao: *See*—
Aizawa, Masandou; Yamauchi, Shigekazu; Sekine, Hisao; and Yamamoto, Takeshi, 4,684,218, Cl. 350-339.00F.

Senopole, John J.: *See*—
Kurtti, Gary R.; Ches, Gregory S.; Brender, David T.; and Senopole, John J., 4,684,077, Cl. 242-107.600.

Serpone, Nick: *See*—
Graetzel, Michael; Serpone, Nick; and Duonghong, Dung, 4,684,537, Cl. 427-53.100.

Seshimoto, Osamu; Nirasawa, Mituharu; Terashima, Masaaki; and Saito, Yoshio, to Fuji Photo Film Co., Ltd. Method and device of measuring ion activity. 4,684,445, Cl. 204-1.00T.

Seuref A.G.: *See*—
Bertelli, Alberto, 4,684,520, Cl. 424-94.100.

Severinsky, Alexander J., to Unitron, Inc. Modulator control for inverter. 4,685,042, Cl. 363-41.000.

Seymour, Robert J.; Liu, Jia-ming; and Chen, Ying C., to GTE Laboratories Incorporated. Optical multivibrator. 4,685,108, Cl. 372-19.000.

Shaffer, Howard R.: *See*—
Long, William B.; Over, Gary L.; Shaffer, Howard R.; and Shuey, John R., 4,684,192, Cl. 439-374.000.

Shaffner, Lorn O. Line fastening unit. 4,683,831, Cl. 114-218.000.

Shah, Ashwin H., to Texas Instruments Incorporated. SRAM with constant pulse width. 4,685,087, Cl. 365-227.000.

Shallenberger, John M., to Westinghouse Electric Corp. Reconstitutable nuclear reactor fuel assembly with unitary removable top nozzle subassembly. 4,684,503, Cl. 376-446.000.

Shallenberger, John M.: *See*—
Gjertsen, Robert K.; Shallenberger, John M.; and Wilson, John F., 4,684,500, Cl. 376-446.000.

Shape Inc.: *See*—
Swinburne, Stephen G.; and Gelardi, Anthony L., 4,685,017, Cl. 360-133.000.

Shapiro, Rafael, to Du Pont de Nemours, E. I., and Company. Herbicidal thiophenesulfonamides. 4,684,393, Cl. 71-90.000.

Sharp, Bernard C., to Parker Hannifin Corporation. Winter wiper blade. 4,683,606, Cl. 15-250.420.

Sharp Kabushiki Kaisha: *See*—
Hanatani, Sekio; and Yakushiji, Tuguharu, 4,683,967, Cl. 177-144.000.
Kishi, Kohhei; Koden, Mitsuhiro; and Funada, Fumiaki, 4,684,435, Cl. 156-632.000.
Tsutsui, Akio, 4,684,987, Cl. 358-148.000.
Uratani, Munehiro, 4,684,829, Cl. 307-449.000.

Shaub, Harold: *See*—
Bock, Jan; Brownawell, Darrell W.; Gutierrez, Antonio; Robbins, Max L.; Shaub, Harold; and Steyn, Peter L., 4,684,473, Cl. 252-49.800.

Shaw, Herbert J.; Youngquist, Robert C.; and Brooks, Janet L., to Leland Stanford Junior University, The Board of Trustees of the. Single mode fiber optic single sideband modulator and method of frequency. 4,684,215, Cl. 350-96.290.

Shaw, Richard F.: *See*—
Fife, Robert M.; Ross, Dennis; and Shaw, Richard F., 4,685,031, Cl. 361-413.000.

Shaw, Sam R.: *See*—
Carroll, Arthur B.; Hough, Stewart E.; Hunter, Paul R.; Carstedt, John K.; Shaw, Sam R.; and Garrett, James E., 4,684,801, Cl. 250-221.000.

Shaw/Walker Company: *See*—
Hayman, Eric R.; and Penniman, Scott R., 4,684,154, Cl. 282-29.00R.

Shell Oil Company: *See*—
Heard, Nigel A., 4,684,776, Cl. 219-10.55M.

Sheppard, Clyde H.: *See*—
Lubowitz, Hyman R.; and Sheppard, Clyde H., 4,684,714, Cl. 528-353.000.

Shero, David J.: *See*—
Dadpey, Habib; and Shero, David J., 4,684,868, Cl. 318-802.000.

Shibata, Akihiro: *See*—
Nishikawa, Yoshihiro; Kanemitsu, Kimihiro; Katori, Tatsuhiko; Shibata, Akihiro; and Kukita, Kenichi, 4,684,719, Cl. 536-119.000.

Shibata, Ko: *See*—
Kimata, Kei; Kato, Masahiro; and Shibata, Ko, 4,684,356, Cl. 464-111.000.

Shibata, Toshihiro: *See*—
Kubota, Naohiro; Shibata, Toshihiro; and Nishimura, Atsushi, 4,684,680, Cl. 524-91.000.

Shibatani, Juichi: *See*—
Nishii, Michiharu; Furuta, Youichi; Tsubouchi, Kaoru; Murata, Takeo; Shibatani, Juichi; and Kiriyama, Takashi, 4,683,807, Cl. 92-169.000.

Shibazaki Seisakusho Ltd.: *See*—
Takayama, Hajime, 4,684,426, Cl. 156-220.000.

Shibuya, Toshifumi: *See*—
Takahashi, Hiroaki; Kobayashi, Masaharu; Noguchi, Takaharu; Shibuya, Toshifumi; and Arai, Takao, 4,685,004, Cl. 360-32.000.

Shikama, Toshihiro; Ota, Takahisa; Ishizaka, Michihiro; Kira, Hirofumi; Horiguchi, Akira; and Kooi, Yuji, to Mitsubishi Denki Kabushiki Kaisha. Loop transmission method. 4,685,105, Cl. 370-86.000.

Shim-A-Line, Inc.: *See*—
Specktor, John; and Specktor, Gerald A., 4,684,150, Cl. 280-661.000.

Shimakawa, Chitoshi: *See*—
Takenaka, Shinji; Oi, Ryu; and Shimakawa, Chitoshi, 4,684,449, Cl. 204-75.000.

Shimamura, Haruo; Kobayashi, Hideo; and Asakura, Masahiko, to Honda Giken Kogyo Kabushiki Kaisha. Device for controlling the increased fuel supply for engines. 4,683,860, Cl. 123-492.000.

Shimaoka, Motohiro; and Saito, Yukio, to Alps Electric Co. Recording and reproducing apparatus including a cassette loading device. 4,685,011, Cl. 360-97.000.

Shimizu, Tokihiko: *See*—
Imai, Akihiro; Shimizu, Tokihiko; and Taguchi, Nobuyoshi, 4,684,561, Cl. 428-141.000.

Shimizu, Tokuzo, to Teac Corporation. Tape cassette having a reel support structure. 4,684,078, Cl. 242-199.000.

Shimojima, Yoji: *See*—
Matsunaga, Hiroshi; Shimojima, Yoji; Tokunaga, Ichiro; and Obata, Kosei, 4,684,210, Cl. 350-96.200.

Shimoni, Yair: *See*—
Fenster, Paul; and Shimoni, Yair, 4,685,146, Cl. 382-54.000.

Shin, Myung Chul; Kim, Chil Sung; Chung, Young Hoon; and Jee, Kwang Koo, to Korea Advanced Institute of Science & Technology. Twin-crank type heat engine. 4,683,721, Cl. 60-527.000.

Shinoda, Tsutae: *See*—
Otsuka, Akira; Shinoda, Tsutae; Horio, Kenji; and Tanioka, Tsuyoshi, 4,684,849, Cl. 315-169.400.

Shinopulos, George: *See*—
Bower, Terry F.; Randlett, M. Ronald; and Shinopulos, George, 4,683,938, Cl. 164-413.000.

Shioi, Yuji: *See*—
Yuhara, Yukitomo; and Shioi, Yuji, 4,683,899, Cl. 132-82.00R.

Shionozaki, Yoshio; Mukai, Hiroshi; Obikawa, Tsuyoshi; and Yamada, Shuhei, to Seiko Epson Kabushiki Kaisha. 2-phenylpyridine derivatives and liquid crystal compositions including same. 4,684,220, Cl. 350-350.00R.

Shioya, Masaharu: *See*—
Honjo, Yoshiaki; and Shioya, Masaharu, 4,683,973, Cl. 180-252.000.

Shishido, Katsuya: *See*—
Hattori, Toshihiro; Shishido, Katsuya; Kasai, Hitoshi; Moride, Shigeki; and Ogawa, Noriaki, 4,685,051, Cl. 364-424.100.

Shop-Vac Corporation: *See*—
Berfield, Robert C.; and Meland, Ronald F., 4,683,608, Cl. 15-328.000.

Shoup, Curtis C.: *See*—
Akiyama, Steven R.; Zaker, Ronald C.; and Shoup, Curtis C., 4,685,037, Cl. 362-276.000.

Showa Electric Wire & Cable Co., Ltd.: *See*—
Yokoyama, Takeo, 4,684,906, Cl. 333-143.000.

Shreve, John R.; and Kearney, Mark B., to General Motors Corporation. Electrical system utilizing a concentric collector PNP transistor. 4,684,877, Cl. 323-269.000.

Shrum, William M., Jr. Multi-stage hydraulic drive system. 4,683,988, Cl. 187-9.00E.

Shu-Ti Lee, Peter; Majkowski, Richard F.; and Partin, Dale L., to General Motors Corporation. Method and apparatus for measuring stable isotopes. 4,684,805, Cl. 250-343.000.

Shue, Ho-Jane: *See*—
Blythin, David J.; and Shue, Ho-Jane, 4,684,727, Cl. 544-127.000.

Shuey, John R.: *See*—
Long, William B.; Over, Gary L.; Shaffer, Howard R.; and Shuey, John R., 4,684,192, Cl. 439-374.000.

Shufflebarger, Earl D.: *See*—
Kolenc, Terrence J.; Bork, Carl R., Jr.; Steiss, William C.; Shufflebarger, Earl D.; and Tobbe, William P., 4,684,106, Cl. 251-335.200.

Shuman, Ralph J.; and Burns, Barbara, to Dennison Manufacturing Company. Readhering and removable adhesive. 4,684,685, Cl. 524-270.000.

Shurman, Louis W.; and Bryant, Lynn A., to Firestone Tire & Rubber Company, The. Apparatus for introducing appliques to the sidewall of a tire. 4,684,431, Cl. 156-394.100.

Shyam, Krishnamurthy: *See*—
Sartorelli, Alan C.; and Shyam, Krishnamurthy, 4,684,747, Cl. 564-081.000.

Si, Stephen S.: *See*—
Lee, Hsiao-Peng S.; Rawlinson, Stephen J.; and Si, Stephen S., 4,685,058, Cl. 364-200.000.

Siano, Donald B.: *See*—
Eustace, Daniel J.; Siano, Donald B.; Drake, Evelyn N.; and Calcavecchio, Peter, 4,683,953, Cl. 166-294.000.

Siemens Aktiengesellschaft: *See*—
Dittmann, Michael, 4,684,909, Cl. 335-128.000.
Dittmann, Michael; and Stadler, Heinz, 4,684,910, Cl. 335-274.000.
Goldmann, Horst; Mayr, Ernst; and Oestreich, Ulrich, 4,684,214, Cl. 350-96.230.
Graumann, Rainer, 4,684,892, Cl. 324-309.000.
Kupec, Peter; Metzner, Uwe; and Thilo, Peer, 4,684,932, Cl. 340-564.000.
Plies, Erich; and Kuck, Gerd, 4,684,808, Cl. 250-396.00R.
Rohrle, Josef, 4,684,862, Cl. 318-568.000.
Segal, Henry P.; and Dewilde, Carl, 4,685,101, Cl. 370-84.000.
Weibelzahl, Manfred; Wild, Georg; and Sadek, Kadry, 4,685,044, Cl. 363-51.000.
Weihrich, Georg; and Wohld, Dietrich, 4,685,063, Cl. 364-472.000.
Zibis, Peter, 4,684,907, Cl. 333-196.000.

Signetics Corporation: *See*—
Dhuyvetter, Timothy A., 4,684,898, Cl. 329-104.000.

Sikina, Thomas V.: *See*—
Sloane, Maurice W.; and Sikina, Thomas V., 4,684,970, Cl. 357-35.000.

Silverbush, Jerome, to New York Telephone Company. Telephone pay station and circuit therefor. 4,685,126, Cl. 379-146.000.

Simanainen, Jyrki, to Enso-Gutzeit Oy. Drum press. 4,683,816, Cl. 100-121.000.

Simkins, Philip P., to Hewitt, Steven W., a part interest. Display case for fragrance bottles, jewelry, or the like. 4,684,016, Cl. 206-45.130.

Skarland, Henrik. Transportable seating device. 4,684,090, Cl. 248-155.000.

Skarsvaag, Kristian; Sunde, Andreas J.; and Thue, Sverre, to Texaco Inc. Characterization of two-phase flow in pipes. 4,683,759, Cl. 73-861.040.

SKF Textilmaschinen-Komponenten GmbH: *See*—
Glock, Alfred, 4,683,711, Cl. 57-81.000.

Skinner, James L., to Atlantic Richfield Company. Drilling cuttings treatment. 4,683,963, Cl. 175-66.000.

Sloane, Maurice W.; and Sikina, Thomas V., to RCA Corporation. High current lateral transistor structure. 4,684,970, Cl. 357-35.000.

Sloate, Harry M. Pilot controlled valves. 4,683,915, Cl. 137-625.630.

Small, Larry A., to Data General Corporation. Method and apparatus for storing and retrieving keyboard LED data. 4,684,934, Cl. 340-712.000.

Smith, Charles M.: *See*—
Wagner, Earl F.; and Smith, Charles M., 4,684,101, Cl. 249-144.000.

Smith, Dale K.; Donich, Thomas G.; Dickerson, Bobby V.; and Leader, Raymond E., to Rockwell International Corporation. Meteor scatter burst communication system. 4,685,149, Cl. 455-56.000.

Smith, Donald T.: *See*—
Anderson, Jerry M.; Cannon, Thomas C., Jr.; Darden, Bruce V.; and Smith, Donald T., 4,684,195, Cl. 439-404.000.

Smith, Gerald B.: *See*—
Cullingford, Christopher V.; Forrester, John S.; and Smith, Gerald B., 4,683,746, Cl. 73-118.100.

Smith International, Inc.: *See*—
Kar, Nareshchandra J.; Salesky, William J.; and Guzowski, Steven J., 4,683,781, Cl. 76-108.00A.

Smith, Morley L., to Ontario Drive and Gear Limited. Trailer for all-terrain vehicle. 4,683,970, Cl. 180-15.000.

Smith, Paul F.; Schorman, Eric R.; and Burke, Timothy M., to Motorola, Inc. Method of communications between register-modelled radio devices. 4,684,941, Cl. 340-825.520.

Smith, Philip L.; and Caprio, Joseph R., to Kupler Corporation. Electrical clamp connector. 4,684,196, Cl. 439-411.000.

Smith, Richard D., to Internationale Octrooi Maatschappij "Octropa" BV. Hose coupling. 4,684,157, Cl. 285-256.000.

Smith, Steven A. Collar for retaining camera bracket mount in place. 4,684,230, Cl. 354-293.000.

Smith, Wade W.: *See*—
Bierkamp, James A.; Hall, Scott D.; and Smith, Wade W., 4,683,942, Cl. 165-53.000.

SmithKline Beckman Corporation: *See*—
Ali, Fadia E.; and Huffman, William F., 4,684,622, Cl. 514-11.000.
Callahan, James F.; Huffman, William F.; Moore, Michael L.; and Yim, Nelson C., 4,684,621, Cl. 514-11.000.
Yim, Nelson C., 4,684,716, Cl. 530-328.000.

Smitt, Eric L.; and Collins, Robert J., to Data General Corporation. Microprocessor based control and switching device. 4,685,124, Cl. 379-95.000.

Snedeker, Richard S., to Aeronatical Research Associates of Princeton, Inc. Modular armor. 4,683,800, Cl. 89-36.020.

Societe Anonyme dite: BIOTHERM: *See*—
Marissal, Jeanine; and Aubert, Lucien P., 4,684,522, Cl. 424-195.100.

Societe d'Etudes Techniques et d'Entreprises Generales: *See*—
Charmeux, Gilbert, 4,684,940, Cl. 340-815.200.

Societe Nationale d'Etude et de Construction de Moteur d'Aviation "S.N.E.C.M.A.": *See*—
Naud, Henry, 4,683,717, Cl. 60-226.100.

Societte Anonyme Nomegasgne Toutlectric: *See*—
Grandclement, Gerard, 4,684,417, Cl. 156-64.000.

Sodeikat, Dieter, to Messerschmitt-Bolkow-Blohm Gesellscaft mit beschrankter Haftung. Method and apparatus for processing the output signals of an optical earth-horizon sensor operating in the infrared range of an orbiting earth satellite. 4,684,804, Cl. 250-338.000.

Soderlund, Ernest E., to GTE Communication Systems Corporation. Universal test circuit for integrated circuit packages. 4,684,884, Cl. 324-73.00R.

Sodra Skogsagarna AB—Monsteras Bruk: *See*—
Andersson, Susanne; Gustafsson, Jan-Erik; Herngren, Torbjorn; and Carlsson, Staffan, 4,683,841, Cl. 122-22.000.

Soerens, Dave A., to Kimberly-Clark Corporation. Creping adhesives containing polyvinyl alcohol and thermoplastic polyamide resins derived from poly(oxyethylene) diamine. 4,684,439, Cl. 162-111.000.

Sogo, Yoshitaka; Fukushima, Masami; and Kuzuya, Tetsuro, to Toyota Jidosha Kogyo Kabushiki Kaisha. Gear-teeth protector in change-speed gearing units. 4,683,771, Cl. 74-467.000.

Solex and Regie Nationale des Uines Renault: *See*—
Micard, Guy, 4,684,104, Cl. 251-129.050.

Solie, John B.; Wittmuss, Howard D.; and Burnside, Orvin C., to University of Nebraska, The Board of Regents of the. Subsurface application of chemicals. 4,683,826, Cl. 111-7.000.

Solo Cup Company: *See*—
Brewer, Clarence T., 4,684,036, Cl. 221-61.000.

Solomon, Allen C. Lane changing signalling device. 4,684,918, Cl. 340-73.000.

Soltau, Gerd. Apparatus for below-ground driving of pipeline segments. 4,684,290, Cl. 405-184.000.

Somatani, Toshifumi: *See*—
Nakajima, Shigeru; Minegishi, Kazushige; Miura, Kenji; Morie, Takashi; and Somatani, Toshifumi, 4,683,643, Cl. 437-203.000.

Sommargren, Gary E., to Zygo Corporation. Apparatus to transform a single frequency, linearly polarized laser beam into a beam with two, orthogonally polarized frequencies. 4,684,828, Cl. 307-425.000.

Sommer, Benjamin. Measuring gauge. 4,683,661, Cl. 33-169.00B.

Sony Corporation: *See*—
Akagiri, Kenzo; and Nishiguchi, Masayuki, 4,685,115, Cl. 375-25.000.

Ohyama, Masao, 4,685,008, Cl. 360-85.000.
Toyoshima, Masakatsu; Hideshima, Yasuhiro; and Fujita, Etsumi, 4,684,981, Cl. 358-86.000.
Yoshida, Tadao, 4,685,098, Cl. 369-59.000.

Soroka, Daniel P.: *See—*
Antoszewski, Richard S.; and Soroka, Daniel P., 4,684,312, Cl. 414-735.000.

Southwestern Bell Telephone: *See—*
Miller, Arthur O.; Coleman, Hollis; Atkinson, Roger; and Dorsey, Boyd, 4,685,127, Cl. 379-221.000.

Spear, Walter E.: *See—*
Owen, Alan E.; Sarrabayrouse, Gerard; LeComber, Peter G.; and Spear, Walter E., 4,684,972, Cl. 357-59.000.

Specktor, Gerald A.: *See—*
Specktor, John; and Specktor, Gerald A., 4,684,150, Cl. 280-661.000.

Specktor, John; and Specktor, Gerald A., to Shim-A-Line, Inc. Apparatus for adjusting camber and toe. 4,684,150, Cl. 280-661.000.

Spector, Magaly: *See—*
Ackerman, David A.; Camarda, Renato M.; Hartman, Robert L.; and Spector, Magaly, 4,684,883, Cl. 324-71.500.

Spectra-Physics, Inc.: *See—*
Baer, Michael T., 4,685,111, Cl. 372-18.000.
Carlson, Lee R.; Hegedus, Denes A.; Jarrett, Steven M.; Miller, Michael F.; Riley, Martin E.; and Wright, David L., 4,685,109, Cl. 372-61.000.
DeBell, Gary W.; Wright, David L.; Ruddock, Kenneth A.; Petersen, Alan B.; Carlson, Lee R.; and von Gunten, Marc K., 4,685,110, Cl. 372-103.000.
Hart, Edward E., 4,684,836, Cl. 310-83.000.
Kafka, James D.; Baer, Thomas M.; and Head, David F., 4,685,107, Cl. 372-6.000.

Spence, John R., to Rockwell International Corporation. Non-volatile ram cell with charge pumps. 4,685,085, Cl. 365-190.000.

Sperakis, Thomas A.: *See—*
McDonald, Allen S.; Philp, Charles W.; and Sperakis, Thomas A., 4,684,052, Cl. 228-122.000.

Speranza, Joseph J.: *See—*
Berlinger, Gregory J.; and Speranza, Joseph J., 4,684,779, Cl. 219-121.0LD.

Sperry Corporation: *See—*
Bishop, F. Avery; and Bennett, Steven L., 4,685,132, Cl. 380-46.000.
Miller, Larry J.; Rattlingourd, Glen D.; and Johnson, Clifford T., 4,685,106, Cl. 370-112.000.

Spickard, Gerald V. Grocery bag holder and kit for the assembly thereof. 4,684,087, Cl. 248-97.000.

Spierings, Gijsbertus A. C. M.; and Van Hove, Eddy F. C., to U.S. Philips Corporation. Glass composition suitable for use in a fluorescent lamp, tube and lamp envelope manufactured from said glass composition, and fluorescent lamp having a lamp envelope manufactured from said glass composition. 4,684,847, Cl. 313-493.000.

Spietschka, Ernst: *See—*
Schiessler, Siegfried; and Spietschka, Ernst, 4,684,753, Cl. 570-206.000.

Spitler, James A.: *See—*
Mann, Joseph M.; and Spitler, James A., 4,684,786, Cl. 219-297.000.

Sprecher & Schuh AG: *See—*
Wuthrich, Hans-Rudolf, 4,684,771, Cl. 200-144.00B.

Sproessler, Bruno: *See—*
Plainer, Hermann; Sproessler, Bruno; and Uhlig, Helmut, 4,684,525, Cl. 426-16.000.

Square D Company: *See—*
Lehman, Lewis M., 4,684,772, Cl. 200-144.00R.
Nichols, E. Lane, III; Hooper, William P.; and Leynse, Kenneth J., 4,685,022, Cl. 361-44.000.

SRX Corporation: *See—*
Johnson, Charles B.; Box, Jeffrey L.; and Hildebrand, David B., 4,685,104, Cl. 370-67.000.

SS Pharmaceutical Co., Ltd.: *See—*
Nishikawa, Yoshihiro; Kanemitsu, Kimihiro; Katori, Tatsuhiko; Shibata, Akihiro; and Kukita, Kenichi, 4,684,719, Cl. 536-119.000.

Stadler, Heinz: *See—*
Dittmann, Michael; and Stadler, Heinz, 4,684,910, Cl. 335-274.000.

Stahl, Hans G.; Hohlein, Peter; Traenckner, Hans-Joachim; Fleiter, Lothar; and Schwindt, Jurgen, to Bayer Aktiengesellschaft. Process for the production of siccativated aqueous lacquers with polybutadiene/maleic acid anhydride adducts as bonding agent. 4,684,691, Cl. 524-534.000.

Stait, Donald: *See—*
Frei, Urs; Richter, Harald; and Stait, Donald, 4,684,276, Cl. 400-630.000.

Stal Refrigeration AB: *See—*
Andersson, Lars; Glanvall, Rune; Ericson, Kjell; and Lundberg, Anders, 4,684,330, Cl. 417-360.000.

Staley, Lester K.: *See—*
Watkins, Grant H.; and Staley, Lester K., 4,684,904, Cl. 331-117.00R.

Stamper, James F., to Lear Siegler, Inc. Retractable clothesline device. 4,684,076, Cl. 242-100.100.

Standard Oil Company: *See—*
Percec, Elena S.; and Li, George S., 4,684,376, Cl. 55-16.000.

Standard Oil Company (Indiana): *See—*
Brooks, Gary T., 4,684,674, Cl. 523-205.000.

Standard Telephones & Cables: *See—*
Heinecke, Rudolf A. H.; Ojha, Suresh M.; and Llewellyn, Ian P., 4,684,535, Cl. 427-38.000.

Stange, Charles E. Wheel manipulator. 4,684,310, Cl. 414-427.000.

Stanley Electric Co., Ltd.: *See—*
Aizawa, Masandou; Yamauchi, Shigekazu; Sekine, Hisao; and Yamamoto, Takeshi, 4,684,218, Cl. 350-339.00F.

Stape, William J.: *See—*
Weber, Robert N.; and Stape, William J., 4,684,211, Cl. 350-96.200.

Star Headlight & Lantern Company, Inc.: *See—*
Balogh, Francis, 4,684,852, Cl. 315-241.00R.

Stark, Robert A., to Dresser Industries, Inc. Method and apparatus for controlling hydraulic vehicle transmission. 4,684,004, Cl. 192-87.130.

Starke, Roy R., to United States of America, Air Force. Separable hinge with self retaining hinge pin. 4,683,613, Cl. 16-262.000.

Staton, Richard D.: *See—*
Lamond, Lee T.; and Staton, Richard D., 4,684,098, Cl. 248-407.000.

Staudinger, Hermann: *See—*
Hawelka, Walter; and Staudinger, Hermann, 4,683,976, Cl. 180-311.000.

Stauffer Chemical Company: *See—*
Mirviss, Stanley B., 4,684,735, Cl. 548-308.000.
Stewart, John M.; Clark, Teddy R.; and Edging, Thomas E., 4,684,512, Cl. 423-321.00R.

Stauner, Jakob: *See—*
Kunz, Rainer; Stauner, Jakob; and Weber, Robert, 4,684,492, Cl. 376-203.000.

Stearns, Richard G.: *See—*
Kino, Gordon S.; Stearns, Richard G.; and Khuri-Yakub, Butrus T., 4,683,750, Cl. 73-606.000.

Stec, Wojciech; Kinas, Ryszard; and Misiura, Konrad, to Polska Akademia Nauk-Centrum Baden Molekularnych i Makromolekularnych. Process for the production of 2-(2-halogenoethylamino)-2-oxo-3-(2-halogenoethyl)-1.3.2.-oxazaphosphorinanes. 4,684,742, Cl. 558-81.000.

Steenhof, Frits A.; Welles, Petrus W. G.; Nuijten, Petrus A. C. M.; and van der Meer, Jan, to U.S. Philips Corporation. Television signal memory-write circuit. 4,684,986, Cl. 358-148.000.

Steidl, Larry E.; and Stemm, Christopher D., to Goodyear Tire & Rubber Company, The. Rod gland and hub assembly for tire curing press. 4,684,338, Cl. 425-33.000.

Steigerwald, Robert L.; and Mistry, Keku M., to General Electric Company. Integrated circuit for controlling power converter by frequency modulation and pulse width modulation. 4,685,040, Cl. 363-17.000.

Steigerwald, Robert L.: *See—*
Miller, Timothy J. E.; Plunkett, Allan B.; and Steigerwald, Robert L., 4,684,867, Cl. 318-701.000.

Stein, Hermann: *See—*
Welzel, Peter; Kunisch, Franz; Stein, Hermann; Hiltmann nee Ponty, Aranka; and Kruggel, Frithjof, 4,684,626, Cl. 514-25.000.

Steiner, Karl, to Maschinenfabrik Heid Aktiengesellschaft. Tool Holder for a machine tool. 4,683,626, Cl. 29-40.000.

Steiss, William C.: *See—*
Kolenc, Terrence J.; Bork, Carl R., Jr.; Steiss, William C.; Shufflebarger, Earl D.; and Tobbe, William P., 4,684,106, Cl. 251-335.200.

Stemm, Christopher D.: *See—*
Steidl, Larry E.; and Stemm, Christopher D., 4,684,338, Cl. 425-33.000.

Stengel, Bruce W.: *See—*
Jonovic, John A.; Stengel, Bruce W.; and Mally, Timothy G., 4,684,040, Cl. 222-148.000.

Stepp, Lee W.; Baldridge, Morris G.; and Treece, Harold O., to Halliburton Company. Automatic fill-up floating apparatus. 4,683,955, Cl. 166-327.000.

Sterling Drug Inc.: *See—*
Christiansen, Robert G.; Bell, Malcolm R.; Herrmann, John L., Jr.; and Opalka, Chester J., Jr., 4,684,636, Cl. 514-176.000.

Sterner, Maurice E., Jr., to Product Design & Development, Inc. Tilt window balance shoe assembly. 4,683,676, Cl. 49-181.000.

Stevens, Carlile R. Variable frequency bridge inverter for driving gas discharge lamps. 4,684,850, Cl. 315-209.00R.

Stevens, Timothy S.: *See—*
Peters, Thomas L.; and Stevens, Timothy S., 4,684,470, Cl. 210-639.000.

Stewart, Jim L., to General Battery Corporation. Battery formation charging apparatus. 4,684,872, Cl. 320-45.000.

Stewart, Jimmy L., to General Battery Corporation. High voltage test confirmation apparatus. 4,684,887, Cl. 324-158.00R.

Stewart, John M.; Clark, Teddy R.; and Edging, Thomas E., to Stauffer Chemical Company. Phosphate recovery from wet phosphoric acid purification process. 4,684,512, Cl. 423-321.00R.

Steyn, Peter L.: *See—*
Bock, Jan; Brownawell, Darrell W.; Gutierrez, Antonio; Robbins, Max L.; Shaub, Harold; and Steyn, Peter L., 4,684,473, Cl. 252-49.800.

Steyr-Daimler-Puch AG: *See—*
Stockmar, Jurgen; and Friedrich, Karl, 4,683,997, Cl. 192-58.00C.

Stock, James H. Clean box. 4,683,761, Cl. 73-864.340.

Stocker, Erwin: *See—*
Erdt, Wolfgang; Reitberger, Rudolf; and Stocker, Erwin, 4,684,303, Cl. 409-235.000.

Stockmar, Jurgen; and Friedrich, Karl, to Steyr-Daimler-Puch AG. Temperature compensating fluid friction clutch. 4,683,997, Cl. 192-58.00C.

Stone, J. P.: *See*—
Ewen, A. T. E.; and Stone, J. P., 4,684,428, Cl. 156-257.000.

Stones, David I.: *See*—
Swift, Gerald W.; and Stones, David I., 4,684,874, Cl. 333-125.000.

Stothert & Pitt PLC: *See*—
Goodridge, Raymond A. L., 4,684,335, Cl. 418-189.000.

Strange, Andrew: *See*—
Beck, Willi K.; Danielson, Lincoln V.; and Strange, Andrew, 4,684,769, Cl. 200-61.890.

Strategic Energy Services, Inc.: *See*—
Jones, Brian D., 4,683,946, Cl. 166-170.000.

Streater, Richard W.: *See*—
Este, Grantley O.; Suthers, Mark S.; Streater, Richard W.; and MacLaurin, Blair K., 4,684,841, Cl. 310-313.00B.

Streeter, Edward C. Wide angle control of permanent magnet rotors. 4,684,911, Cl. 335-288.000.

Streit, Peter, to U.S. Philips Corporation. Liquid crystal display device. 4,684,939, Cl. 340-784.000.

Strickler, James E.; and Strickler, Jeffrey E. Container and follow plate assembly usable with viscous material dispensers having receiving ports of two different sizes. 4,684,042, Cl. 222-327.000.

Strickler, Jeffrey E.: *See*—
Strickler, James E.; and Strickler, Jeffrey E., 4,684,042, Cl. 222-327.000.

Striker, Richard A.: *See*—
Eckberg, Richard P.; Striker, Richard A.; and Modic, Frank J., 4,684,670, Cl. 522-13.000.

Strongwater, Murray. Combination ice scraper and mitt. 4,683,592, Cl. 2-17.000.

Struthers, Ralph C. Hydrogen diffusion fuel cell. 4,684,581, Cl. 429-19.000.

Stuetz, Anton, to Sandoz Ltd. Anti-fungal homopropargylamines, compositions, and method of use therefor. 4,684,661, Cl. 514-443.000.

Stumpf, Gunter O., to Gunter O. Stumpf GmbH & Co. KG. Manually controllable machine such as a fabric cutting machine. 4,683,658, Cl. 30-275.000.

Stupeck, Donald G.: *See*—
Nazarian, Ara W.; and Stupeck, Donald G., 4,685,007, Cl. 360-78.000.

Su, Peter T. Container with adjustable controlled volume liquid pouring element. 4,684,045, Cl. 222-456.000.

Suarato, Antonino: *See*—
Bargiotti, Alberto; Caruso, Michele; Suarato, Antonino; Penco, Sergio; and Giuliani, Fernando, 4,684,629, Cl. 514-34.000.

Subherwal, Bodh R., to BR Laboratories, Inc. Water heater secondary control device. 4,684,061, Cl. 236-20.00R.

Sugano, Mamoru: *See*—
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, 4,684,651, Cl. 514-253.000.
Kikumoto, Ryoji; Fukami, Harukazu; Nakao, Kenichiro; and Sugano, Mamoru, 4,684,739, Cl. 549-350.000.

Sugihara, Shoichi; and Katoh, Sumio, to Mitsubishi Denki Kabushiki Kaisha. Feedback comb-type filter. 4,684,976, Cl. 358-31.000.

Sugimori, Shigeru; Nigorikawa, Kazunori; and Ogawa, Tetsuya, to Chisso Corporation. Pyridine derivatives and their use in liquid crystals. 4,684,477, Cl. 252-299.610.

Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Ogawa, Tetsuya; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, to Chisso Corporation. Novel liquid crystal compound for high temperatures. 4,684,478, Cl. 252-299.630.

Sugimori, Shigeru: *See*—
Kitano, Kisei; Ogawa, Tetsuya; Furukawa, Yoshito; Yoshida, Naoyuki; Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; and Nigorikawa, Kazunori, 4,684,476, Cl. 252-299.610.

Sugishima, Kenji; and Yasuda, Hiroshi, to Fujitsu Limited. Frictionless supporting apparatus. 4,684,315, Cl. 414-749.000.

Sugiura, Hiroyuki, to Diesel Kiki Co., Ltd. Air conditioner for automotive vehicles capable of cooling intake air supplied to an internal combustion engine. 4,683,725, Cl. 62-199.000.

Sugiura, Katsuhiko, to Fuji Jukogyo Kabushiki Kaisha. Exhaust gas recirculation system. 4,683,863, Cl. 123-568.000.

Suiter, Weyman B.: *See*—
Bowman, Wayne C.; Magalhaes, Frank M.; Suiter, Weyman B.; and Ziesse, Norman G., 4,685,041, Cl. 363-40.000.

Sulzer Brothers Limited: *See*—
Fricker, Hans, 4,683,872, Cl. 126-449.000.

Sumitomo Chemical Company, Ltd.: *See*—
Higashio, Yasuhiko; and Takahashi, Kazuteru, 4,684,758, Cl. 585-608.000.
Miyamoto, Tetsuya; Omura, Takashi; Harada, Naoki; and Takeshita, Akira, 4,684,721, Cl. 540-126.000.
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,684,397, Cl. 71-96.000.
Ooishi, Tadashi, 4,684,634, Cl. 514-144.000.

Sumitomo Electric Industries, Ltd.: *See*—
Kawasaki, Akihisa; Tada, Kohji; Kotani, Toshihiro; and Miyazawa, Shintaro, 4,684,515, Cl. 423-495.000.

Sumitomo Light Metal Industries, Ltd.: *See*—
Itoh, Katsuhisa; Watanabe, Yoshiaki; Nakamura, Eiji; and Toyoshima, Masayasu, 4,684,448, Cl. 204-71.000.

Sumitomo Metal Mining Company Limited: *See*—
Ishikawa, Haruo; and Fujii, Yoshimasa, 4,684,208, Cl. 350-96.150.

Sumitomo Special Metals Co., Ltd.: *See*—
Matsuura, Yutaka; Sagawa, Masato; and Fujimura, Setsuo, 4,684,406, Cl. 75-244.000.

Sunami, Hideo: *See*—
Kimura, Shin-Ichiro; Murakami, Eiichi; Warabisako, Terunori; Miyake, Kiyoshi; and Sunami, Hideo, 4,683,838, Cl. 118-715.000.

Sunde, Andreas J.: *See*—
Skarsvaag, Kristian; Sunde, Andreas J.; and Thue, Sverre, 4,683,759, Cl. 73-861.040.

Sundeen, Joseph E., to E. R. Squibb & Sons, Inc. Monosulfactams. 4,684,722, Cl. 540-203.000.

Sundqvist, Yngve: *See*—
Sahlgren, Anders; Gustafsson, Rolf; Goransson, Bo; and Sundqvist, Yngve, 4,684,268, Cl. 384-574.000.

Sundstrand Corporation: *See*—
Brown, Neil L., 4,684,000, Cl. 192-67.00R.
Cohen, Mordehy; Bettenga, James L.; and Tjenstrom, Brian, 4,683,984, Cl. 184-6.200.
Ewbank, Michael E.; and Heitz, Steven, 4,683,722, Cl. 60-656.000.
Glennon, Timothy F., 4,684,873, Cl. 322-47.000.

Sundstrand Data Control, Inc.: *See*—
Bateman, Charles D., 4,684,948, Cl. 340-970.000.

Sungene Technologies Corporation: *See*—
Hemphill, John K.; and Eikenberry, Eric J., 4,684,612, Cl. 435-240.500.

Sureau, Jean-Claude; and Krystofik, Steven S., to Radant Technologies, Inc. Electromagnetic energy shield. 4,684,954, Cl. 343-909.000.

Susumu Industrial Co., Ltd.: *See*—
Ozawa, Juichiro, 4,684,916, Cl. 338-308.000.

Sutherland, Karl M., to American Hospital Supply Corp. Blood heat exchanger. 4,684,508, Cl. 422-46.000.

Suthers, Mark S.: *See*—
Este, Grantley O.; Suthers, Mark S.; Streater, Richard W.; and MacLaurin, Blair K., 4,684,841, Cl. 310-313.00B.

Suzuki, Atsushi: *See*—
Sato, Yoshihisa; Kinugawa, Masumi; Akiyama, Susumu; Yamada, Toshitaka; Mizuno, Tiaki; and Suzuki, Atsushi, 4,683,858, Cl. 123-486.000.

Suzuki, Sobei: *See*—
Nishizawa, Junichi; Suzuki, Sobei; and Tamamushi, Takashige, 4,684,966, Cl. 357-22.000.

Suzuki, Takayoshi: *See*—
Yamamoto, Fumio; Suzuki, Takayoshi; Ikari, Masahiro; Saito, Susumu; Ohmori, Akira; and Yasuhara, Takashi, 4,684,705, Cl. 526-246.000.

Suzuki, Tokio: *See*—
Takahashi, Toshiaki; and Suzuki, Tokio, 4,684,928, Cl. 340-521.000.

Svarrer, Lauge, to A/S Niro Atomizer. Atomizer wheel with steel bushings. 4,684,065, Cl. 239-224.000.

Svenska Traforskningsinstitutet: *See*—
Andersson, Susanne; Gustafsson, Jan-Erik; Herngren, Torbjorn; and Carlsson, Staffan, 4,683,841, Cl. 122-22.000.

Swaffield, John D., to Alden Research Foundation. High voltage plug and receptacle. 4,684,189, Cl. 439-587.000.

Swanson, Ralph R.: *See*—
Palazzolo, Faro D.; Drake, Brian L.; and Swanson, Ralph R., 4,683,801, Cl. 89-40.120.

Swearingen, Loren L.; Earls, Jimmy D.; and LaTulip, Randy J., to Dow Chemical Company, The. Thermosettable polymer or prepolymer prepared from heterocyclic materials containing a nitrogen atom and carboxylic acid mono- or dianhydride with N,N'-bis-imide. 4,684,693, Cl. 524-600.000.

Swift, Gerald W.; and Stones, David I., to TRW Inc. Radial wave power divider/combiner and related method. 4,684,874, Cl. 333-125.000.

Swinburne, Stephen G.; and Gelardi, Anthony L., to Shape Inc. Write/protect tab assembly for a floppy disc jacket and method for assembling same. 4,685,017, Cl. 360-133.000.

Sydansk, Robert D.; and Argabright, Perry A., to Marathon Oil Company. Conformance improvement in a subterranean hydrocarbon-bearing formation using a polymer gel. 4,683,949, Cl. 166-270.000.

Syntex (U.S.A.) Inc.: *See*—
Eppstein, Deborah A.; Fraser-Smith, Elizabeth; and Matthews, Thomas R., 4,684,625, Cl. 514-19.000.

Szepesi, Gabor: *See*—
Nagy, Geza T.; Szepesi, Gabor; Gazdag, Maria; Papp nee Sziklay, Zsofia; and Burger, Kalman, 4,684,638, Cl. 514-185.000.

Szloboda, Samuel. Vacuum operated apparatus for controlling the ignition timing of an engine. 4,683,853, Cl. 123-407.000.

T. O. Plastics, Inc.: *See*—
Jacobs, Paul J., 4,684,013, Cl. 206-423.000.

Tabak, Andrew, to RCA Corporation. Apparatus subject to random accelerative motion for sensing motion of a magnetically susceptible part. 4,684,888, Cl. 324-207.000.

Tabak, Samuel A.: *See*—
Avidan, Amos A.; Krambeck, Frederick J.; and Tabak, Samuel A., 4,684,757, Cl. 585-331.000.
Derr, W. Rodman, Jr.; Garwood, William E.; Kuo, James C.; Leib, Tiberiu M.; Nace, Donald M.; and Tabak, Samuel A., 4,684,756, Cl. 585-330.000.

Tabor, Ricky L.; and Allen, James A., to Dow Chemical Company, The. Maleic anhydride grafts of olefin polymers. 4,684,576, Cl. 428-441.000.

Tachikawa, Osamu: *See*—
Kinoshita, Tomoaki; Takano, Kunio; Okiyama, Yoichi; and Tachikawa, Osamu, 4,683,827, Cl. 112-121.120.

Taco Bell: *See*—
Cortopassi, Jeffery J., 4,684,023, Cl. 206-459.000.

Tada, Kohji: *See*—
Kawasaki, Akihisa; Tada, Kohji; Kotani, Toshihiro; and Miyazawa, Shintaro, 4,684,515, Cl. 423-495.000.

Tada, Shoji; and Ibuki, Koji, to Mitsubishi Denki Kabushiki Kaisha. Arc detector for gas insulated electrical apparatus. 4,685,018, Cl. 361-1.000.

Taguchi, Kenko, to NEC Corporation. Heterojunction avalanche photodiode. 4,684,969, Cl. 357-30.000.

Taguchi, Nobuyoshi: *See*—
Imai, Akihiro; Shimizu, Tokihiko; and Taguchi, Nobuyoshi, 4,684,561, Cl. 428-141.000.

Taiho Kogyo Kabushiki Kaisha: *See*—
Futamura, Kenichiro; and Ohtsu, Keiichiro, 4,683,804, Cl. 92-71.000.

Tajima, Yusuke; and Tsukii, Toshikazu, to Raytheon Company. Monolithic programmable attenuator. 4,684,965, Cl. 357-22.000.

Takada, Katsuhiro, to Olympus Optical Co., Ltd. Graded refractive index single lens system. 4,684,221, Cl. 350-413.000.

Takafuji, Hideo, to Nippon Steel Corporation. Cable for fastening structures and method of detecting damage to corrosion-preventive layer thereof. 4,684,293, Cl. 405-224.000.

Takagi, Isamu: *See*—
Tanaka, Shigeru; and Takagi, Isamu, 4,684,766, Cl. 174-115.000.

Takahashi, Eisaku: *See*—
Osugi, Katsuhisa; Ichinose, Isao; Takahashi, Eisaku; and Arahira, Masato, 4,684,664, Cl. 514-475.000.

Takahashi, Hiroaki; Kobayashi, Masaharu; Noguchi, Takaharu; Shibuya, Toshifumi; and Arai, Takao, to Hitachi, Ltd. Rotary head type PCM recording and reproduction method and system. 4,685,004, Cl. 360-32.000.

Takahashi, Hiroshi: *See*—
Hatakeyama, Sakichi; and Takahashi, Hiroshi, 4,683,766, Cl. 74-333.000.

Takahashi, Kazuteru: *See*—
Higashio, Yasuhiko; and Takahashi, Kazuteru, 4,684,758, Cl. 585-608.000.

Takahashi, Makoto: *See*—
Matsushita, Tsuyoshi; Maekawa, Motoi; and Takahashi, Makoto, 4,684,275, Cl. 400-479.000.

Takahashi, Masaru: *See*—
Tanabe, Hisao; Takahashi, Masaru; Ozawa, Hiroyasu; Machida, Shoichi; and Kitamura, Makoto, 4,683,993, Cl. 188-321.110.

Takahashi, Osamu: *See*—
Tange, Kohsuke; Takahashi, Osamu; Furuya, Yuhki; and Harada, Akira, 4,683,644, Cl. 437-7.000.

Takahashi, Susumu: *See*—
Yamashita, Nobuo; and Takahashi, Susumu, 4,684,224, Cl. 350-445.000.

Takahashi, Toshiaki; and Suzuki, Tokio, to Alpine Electronics Inc. Motion sensor unit. 4,684,928, Cl. 340-521.000.

Takano, Hajime; and Yamashita, Hiromitsu, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor integrated circuit device having ground connections arranged to eliminate mutual interference between island-disposed electronic circuits. 4,684,973, Cl. 357-68.000.

Takano, Kunio: *See*—
Kinoshita, Tomoaki; Takano, Kunio; Okiyama, Yoichi; and Tachikawa, Osamu, 4,683,827, Cl. 112-121.120.

Takanori, Kohno, to Copal Company Limited. Strobo control circuit. 4,684,234, Cl. 354-421.000.

Takaoka, Tadashi: *See*—
Nohmi, Makoto; Miyamoto, Shoji; Takaoka, Tadashi; and Oshima, Hiroyasu, 4,684,859, Cl. 318-317.000.

Takara Co., Ltd.: *See*—
Urakawa, Shigeki; and Inomata, Noriyuki, 4,684,355, Cl. 446-464.000.

Takasu, Shigeo: *See*—
Sakata, Masataka; Takasu, Shigeo; and Ikimi, Yoshihiro, 4,683,987, Cl. 187-9.00E.

Takayama, Hajime, to Shibazaki Seisakusho Ltd. Method of manufacturing a container cap with a concealed mark. 4,684,426, Cl. 156-220.000.

Takayanagi, Yoshiaki; Ishida, Masato; and Miura, Makoto, to Canon Kabushiki Kaisha. Image forming apparatus with automatic regulation in response to image density. 4,684,239, Cl. 355-14.00R.

Takayasu, Hidekazu, to Sanshin. Fuel supply device of a two-stroke engine for an outboard motor. 4,683,846, Cl. 123-73.00A.

Takeda Chemical Industries, Ltd.: *See*—
Ochiai, Michihiko; Kishimoto, Shoji; and Matsuo, Taisuke, deceased, 4,684,724, Cl. 540-355.000.
Oshima, Junji; Yamada, Minoru; and Kajita, Yasuyuki, 4,684,695, Cl. 525-36.000.

Takei, Katsumori: *See*—
Hayashi, Seiichi; Takei, Katsumori; and Yamaguchi, Yoshitaka, 4,684,563, Cl. 428-207.000.

Takemoto, Tadashi; and Ariyoshi, Yasuo, to Ajinomoto Company Incorporated. Process for producing α-L-aspartyl-L-phenylalanine methyl ester for its hydrochloride. 4,684,745, Cl. 560-41.000.

Takenaka, Shinji; Oi, Ryu; and Shimakawa, Chitoshi, to Mitsui Toatsu Chemicals, Inc. Process for producing m-hydroxybenzyl alcohol. 4,684,449, Cl. 204-75.000.

Takeshita, Akira: *See*—
Miyamoto, Tetsuya; Omura, Takashi; Harada, Naoki; and Takeshita, Akira, 4,684,721, Cl. 540-126.000.

Taketani, Toshinobu; Kuramori, Ken; Sakamoto, Sunji; and Fujii, Hiroshi, to Mazda Motor Corporation. Vehicle assembly line. 4,683,651, Cl. 29-786.000.

Takeuchi, Hiroshi, to Kabushiki Kaisha Daikin Seisakusho. Device for adjusting a clearance of a twin clutch. 4,684,002, Cl. 192-70.250.

Takeuchi, Seiji; and Anger, Byron H., to Don Fell Limited & Donfab Investments, Inc. Inflatable bags. 4,684,026, Cl. 206-522.000.

Takeuchi, Yasushi: *See*—
Handa, Takayuki; Takeuchi, Yasushi; Kato, Masumi; and Seki, Hisazi, 4,684,430, Cl. 156-366.000.

Takiar, Hem P.; and Mehta, Kamal N., to National Semiconductor Corporation. Molded semiconductor package having improved heat dissipation. 4,684,975, Cl. 357-70.000.

Taller, Robert A.; and McGary, Charles W., Jr., to Deseret Medical, Inc. Process for preparation of polyurethane condoms. 4,684,490, Cl. 264-296.000.

Tamalis, William G.: *See*—
Deets, Gary L.; and Tamalis, William G., 4,684,708, Cl. 527-312.000.

Tamamushi, Takashige: *See*—
Nishizawa, Junichi; Suzuki, Sobei; and Tamamushi, Takashige, 4,684,966, Cl. 357-22.000.

Tamary, Ernest J., to Eastman Kodak Company. Fuser temperature control. 4,684,784, Cl. 219-216.000.

Tamatoshi Industries Limited: *See*—
Itagaki, Takafumi, 4,684,286, Cl. 403-407.100.

Tamba, Shinichi: *See*—
Fujikawa, Tetsuzo; Hirata, Makizo; and Tamba, Shinichi, 4,683,847, Cl. 123-90.200.

Tamminen, Pentti J., to LTH Associates (c/o Blaxley-Maddox). Electrochemical generation apparatus and method. 4,684,585, Cl. 429-69.000.

TAMPOflex GmbH: *See*—
Berberich, Bernd, 4,683,821, Cl. 101-170.000.

Tamura, Hiroshi; Nishibori, Kazuyoshi; Yamauchi, Yasutaka; and Kato, Katsushi, to Nippondenso Co., Ltd. Apparatus for injecting fuel into internal combustion engine. 4,683,859, Cl. 123-491.000.

Tamura, Kaoru: *See*—
Matsuda, Terumi; and Tamura, Kaoru, 4,684,592, Cl. 430-6.000.

Tanabe, Hisao; Takahashi, Masaru; Ozawa, Hiroyasu; Machida, Shoichi; and Kitamura, Makoto, to Tokico Ltd. Hydraulic damper. 4,683,993, Cl. 188-321.110.

Tanahashi, Mitsuhiko: *See*—
Higuchi, Takayoshi; Tanahashi, Mitsuhiko; and Mastukura, Motoo, 4,684,740, Cl. 549-464.000.

Tanaka, Akira. Mounting device for helmet. 4,684,096, Cl. 248-309.100.

Tanaka, Koji: *See*—
Sakai, Yasushi; Tanaka, Koji; Saito, Michio; and Kiyohara, Akio, 4,684,711, Cl. 528-86.000.

Tanaka, Minoru: *See*—
Minematsu, Yoshihiko; Tanaka, Minoru; Yamamoto, Masayuki; and Sakamoto, Kenichiro, 4,684,313, Cl. 414-735.000.

Tanaka, Shigeru; and Takagi, Isamu, to Kabushiki Kaisha Toshiba. High voltage cable assembly having reduced stray capacitance. 4,684,766, Cl. 174-115.000.

Tanaka, Toshio, to Yamaha Motor Co., Ltd. Frame body of motorcycle. 4,684,144, Cl. 280-281.00R.

Tane, Jeffrey P.: *See*—
Schultz, William J.; Portelli, Gene B.; and Tane, Jeffrey P., 4,684,678, Cl. 523-466.000.

Tange, Kohsuke; Takahashi, Osamu; Furuya, Yuhki; and Harada, Akira, to Oki Electric Industry Co., Ltd. Automated assembly system for semiconductor device. 4,683,644, Cl. 437-7.000.

Taniguchi, Masao; Morita, Yoshiharu; Hayakawa, Shuzo; and Kawashima, Osamu, to Mitsubishi Chemical Industries Limited. Process for preparation of phthalide derivatives. 4,684,732, Cl. 546-144.000.

Tanimoto, Yoshihiro: *See*—
Kohmoto, Yujiro; and Tanimoto, Yoshihiro, 4,684,235, Cl. 355-3.00R.

Tanioka, Hiroshi; and Ueda, Noriyoshi, to Canon Kabushiki Kaisha. Image reader suitable for manual scanning. 4,684,998, Cl. 358-293.000.

Tanioka, Tsuyoshi: *See*—
Otsuka, Akira; Shinoda, Tsutae; Horio, Kenji; and Tanioka, Tsuyoshi, 4,684,849, Cl. 315-169.400.

Tanishima, Yasuo: *See*—
Tetsu, Sadayuki; and Tanishima, Yasuo, 4,685,034, Cl. 361-424.000.

Tarlow, Kenneth A.; and Ridgley, Brad, to Ridgley, Brad. Tea brewer and dispenser combination. 4,683,812, Cl. 99-289.00R.

Tars, Yaak A.: *See*—
Baraban, Viktor P.; Zabrovsky, Stanislav G.; Zvyagin, Albert F.; Lazarev, Grigory B.; and Tars, Yaak A., 4,685,045, Cl. 363-68.000.

Taschner, Walter: *See*—
Fastner, Thorwald; Mayrhofer, Max; and Taschner, Walter, 4,684,053, Cl. 228-158.000.

Tatarski, Joseph E.: *See*—
Becraft, Arthur D.; Citron, Howard M.; and Tatarski, Joseph E., 4,684,198, Cl. 439-571.000.

Tate, Philip E. R., to Manchem Limited. Adhesion of rubber to metals. 4,684,421, Cl. 156-124.000.

Tatsuta, Mitsugu: *See*—
Yokoyama, Fumitomo; Kuwayama, Yoshinari; Tatsuta, Mitsugu; and Kuramochi, Koujiro, 4,683,903, Cl. 137-56.000.

Taylor, Adoyal. Apparatus for destroying fire ants. 4,683,673, Cl. 43-139.000.

Taylor, Allan H., to United States of America, National Aeronautics and Space Administration. Lightweight piston. 4,683,809, Cl. 92-208.000.

Taylor, David L., Sr.; and Chapman, Hugh N., to Integrated Logic Systems, Inc. Low capacitance transistor cell element and transistor array. 4,684,967, Cl. 357-23.110.

Taylor, Dennis M.: *See*—
Johnson, Bruce S.; and Taylor, Dennis M., 4,684,204, Cl. 439-863.000.

Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J.; and Fletcher, Stephen R., to Princeton University, The Trustees of. Pyrido(2,3-d)pyrimidine derivatives. 4,684,653, Cl. 514-258.000.

Taylor, Richard H.: *See*—
Taylor, William R., Jr.; Taylor, Robert L.; and Taylor, Richard H., 4,683,597, Cl. 4-295.000.

Taylor, Robert L.: *See*—
Taylor, William R., Jr.; Taylor, Robert L.; and Taylor, Richard H., 4,683,597, Cl. 4-295.000.

Taylor, William R., Jr.; Taylor, Robert L.; and Taylor, Richard H. Drain plug. 4,683,597, Cl. 4-295.000.

Tazaki, Satoru, to Clarion Co., Ltd. AC-DC transformation circuit. 4,685,048, Cl. 363-127.000.

Tazewell, Joseph H.: *See*—
Bryant, Lynn A.; Roberts, Durward T., Jr.; Beckman, Joseph A.; Tazewell, Joseph H.; and Cetnar, James F., 4,684,420, Cl. 156-116.000.

TDK Corporation: *See*—
Tokuoka, Yasumichi; Yamakawa, Yoshisuke; and Watanabe, Akio, 4,684,546, Cl. 427-130.000.

Teac Corporation: *See*—
Shimizu, Tokuzo, 4,684,078, Cl. 242-199.000.

Teccor Electronics, Inc.: *See*—
Norris, Richard G.; Webb, Monty F.; and Le, Vinh Q., 4,685,120, Cl. 379-26.000.

Tecumseh Products Company: *See*—
Guntly, Thomas G., 4,684,484, Cl. 261-35.000.

Teerman, Richard F.: *See*—
Cotter, David H.; Teerman, Richard F.; and Timmer, Robert C., 4,684,067, Cl. 239-533.300.

Teichmann, Paul: *See*—
Langen, Manfred; Temburg, Konrad; and Teichmann, Paul, 4,683,619, Cl. 19-159.00A.

Teijin Limited: *See*—
Sasaki, Yoshiyuki; and Kasaoka, Katsuyuki, 4,684,566, Cl. 428-224.000.

Tektronix, Inc.: *See*—
Diller, Calvin D.; and Burke, Michael J., 4,684,881, Cl. 323-354.000.

Teledyne Industries, Inc.: *See*—
Goulet, Carl R., 4,683,854, Cl. 123-478.000.

Telefunken Electronic GmbH: *See*—
Rinderle, Heinz, 4,684,833, Cl. 307-525.000.

Temburg, Konrad: *See*—
Langen, Manfred; Temburg, Konrad; and Teichmann, Paul, 4,683,619, Cl. 19-159.00A.

Terashima, Masaaki: *See*—
Seshimoto, Osamu; Nirasawa, Mituharu; Terashima, Masaaki; and Saito, Yoshio, 4,684,445, Cl. 204-1.00T.

Terni, Patrizia: *See*—
Mascellani, Giuseppe; Fravolini, Arnaldo; and Terni, Patrizia, 4,684,647, Cl. 514-222.000.

Terpstra, Paulus N., to Cacaofabriek de Zaan B.V. Filter for a high pressure separating press. 4,684,466, Cl. 210-227.000.

Terry Corporation: *See*—
Wassell, Mark E.; and Mosimann, John G., 4,684,326, Cl. 416-215.000.

Terumo Kabushiki Kaisha: *See*—
Kobayashi, Susumu; Muramoto, Yutaka; Ishizaka, Hideo; and Ishii, Yoshinori, 4,684,869, Cl. 320-2.000.

Tervamaki, Jukka: *See*—
Kukka, Aarre; Tervamaki, Jukka; Nikulin, Heikki; and Vuorinen, Olavi, 4,684,250, Cl. 356-246.000.

Teskin, Frederick M.: *See*—
Ficker, Harold K.; and Teskin, Frederick M., 4,684,683, Cl. 524-220.000.

Tetschner, Allen. Insulation strip. 4,683,692, Cl. 52-169.110.

Tetsu, Sadayuki; and Tanishima, Yasuo, to Fujitsu Limited. Electric device comprising integrated circuits. 4,685,034, Cl. 361-424.000.

Tew, Claude E.; and Lewis, Adam J., Jr., to Texas Instruments Incorporated. Switching circuit for a detector array. 4,684,812, Cl. 250-578.000.

Texaco Inc.: *See*—
Skarsvaag, Kristian; Sunde, Andreas J.; and Thue, Sverre, 4,683,759, Cl. 73-861.040.

Texas Instruments Incorporated: *See*—
Chauvel, Gerard, 4,684,938, Cl. 340-747.000.
Choate, William C., 4,685,143, Cl. 382-25.000.
Fife, Robert M.; Ross, Dennis; and Shaw, Richard F., 4,685,031, Cl. 361-413.000.
Flinchbaugh, Bruce E., 4,685,070, Cl. 364-522.000.
Lin, Kun-Shan; Goudie, Kathleen M.; and Frantz, Gene A., 4,685,135, Cl. 381-52.000.
Patel, Pravin P.; and Norwood, Roger D., 4,685,089, Cl. 365-233.000.
Shah, Ashwin H., 4,685,087, Cl. 365-227.000.
Tew, Claude E.; and Lewis, Adam J., Jr., 4,684,812, Cl. 250-578.000.
Tregilgas, John H.; and Polgreen, Thomas L., 4,684,415, Cl. 437-228.000.

Thakur, Mrinal K.; Tripathy, Sukant K.; and Sandman, Daniel J., to GTE Laboratories Incorporated. Method for the preparation of thin large-area single crystals of diacetylenes and polydiacetylenes. 4,684,434, Cl. 156-622.000.

Tharman, Paul A., to Briggs & Stratton Corporation. Low oil warning circuit. 4,684,917, Cl. 340-59.000.

Thebert, Glenn W., to General Motors Corporation. Oil scavenge system. 4,683,714, Cl. 60-39.020.

Thermacore, Inc.: *See*—
Ernst, Donald M.; and Toth, Jerome E., 4,683,940, Cl. 165-32.000.

Thermco Systems, Inc.: *See*—
Aldridge, Robert E.; Elloway, Russell; Fritz, William O.; Goff, Ralph D.; and Herrera, Michael J., 4,684,863, Cl. 318-599.000.

Thermo Kinetics Industries, Inc.: *See*—
Gambrell, David E., 4,684,379, Cl. 55-227.000.

Thiele, August: *See*—
Rehbein, Friedhelm; and Peitzmeier, Klaus-Dieter, 4,684,009, Cl. 198-731.000.

Thilo, Peer: *See*—
Kupec, Peter; Metzner, Uwe; and Thilo, Peer, 4,684,932, Cl. 340-564.000.

Thin Film Technology Corporation: *See*—
Ozawa, Juichiro, 4,684,916, Cl. 338-308.000.

Thoeny, Theodore T. Insulated building structure. 4,683,696, Cl. 52-247.000.

Thomas, Richard B. Method and system for controlling use of protected software. 4,685,055, Cl. 364-200.000.

Thomas, Thomas J.: *See*—
Leaseburge, Emory J.; and Thomas, Thomas J., 4,684,465, Cl. 210-198.200.

Thomason, Gary C.: *See*—
Berwick, James W., Jr.; and Thomason, Gary C., 4,684,085, Cl. 244-178.000.

Thompson, David G.: *See*—
McKechnie, Malcolm T.; and Thompson, David G., 4,684,457, Cl. 208-188.000.

Thompson, Gilbert M.: *See*—
Rice, Steven J.; Thompson, Gilbert M.; Dolph, Michael W.; and Montoya, Daniel D., 4,684,259, Cl. 366-185.000.

Thompson, Neil E. S.; Redmore, Derek; Oude Alink, Bernardus A.; and Outlaw, Benjamin T., to Petrolite Corporation. Process of corrosion inhibition using compounds containing sulfur and amino groups. 4,684,507, Cl. 422-12.000.

Thompson, Niels A.: *See*—
Morse, Arthur L.; and Thompson, Niels A., 4,684,800, Cl. 250-211.00J.

Thomson Components-Mostek Corporation: *See*—
Leuschner, Horst, 4,685,083, Cl. 365-185.000.
Powell, Jon N., 4,685,128, Cl. 379-272.000.
Tran, Hiep V., 4,685,086, Cl. 365-203.000.

Thomson-CSF: *See*—
Arques, Marc, 4,685,117, Cl. 377-60.000.
Berger, Jean-Luc; Brissot, Louis; and Cazaux, Yvon, 4,684,993, Cl. 358-213.310.
Kuntzmann, Jean C.; and Tikes, Jacques, 4,684,908, Cl. 333-252.000.

Thue, Sverre: *See*—
Skarsvaag, Kristian; Sunde, Andreas J.; and Thue, Sverre, 4,683,759, Cl. 73-861.040.

Thune-Eureka A/S: *See*—
Berggren, Torsten L., 4,684,073, Cl. 241-247.000.

Thurlow, Norman C.; and Hruda, Robert M., to Westinghouse Electric Corp. Process and system for detecting and measuring a tritium gas leak. 4,683,749, Cl. 73-40.700.

Thurston, Marlin O.: *See*—
Zofan, Ely S.; and Thurston, Marlin O., 4,684,927, Cl. 340-384.00E.

Tiedje, J. Thomas: *See*—
Abeles, Benjamin; Eberhardt, Wolfgang U.; and Tiedje, J. Thomas, 4,684,565, Cl. 428-220.000.

Tieleman, Edward J., to Linco Holland Engineering B.V. Stretching mechanism of a device for cutting slaughtered poultry. 4,683,616, Cl. 17-11.000.

Tieman, Edward A.: *See*—
Hilker, Gregory J.; and Tieman, Edward A., 4,683,775, Cl. 74-710.000.

Tietz, Helmut: *See*—
Mohring, Edgar; Muller, Hanns P.; Roessler, Peter; Wagner, Kuno; and Tietz, Helmut, 4,684,728, Cl. 544-182.000.

Tiffany, Burris D.; Nichols, Steve; Meulman, Paul A.; Hylton, Thomas A.; and Lipton, Michael F., to Upjohn Company, The. Non-hygroscopic adinazolam methanesulfonate salt and process therefor. 4,684,725, Cl. 540-565.000.

Tikes, Jacques: *See*—
Kuntzmann, Jean C.; and Tikes, Jacques, 4,684,908, Cl. 333-252.000.

Till, Henry R.; Warner, Fredrick A.; and Radulski, Charles A., to Xerox Corporation. Intermediate transfer apparatus. 4,684,238, Cl. 355-10.000.

Tillman, Christopher D., to Orbital Research Partners, L.P. Reconfigurable standard switch panel. 4,685,029, Cl. 361-359.000.

Tillotson, Ltd.: *See*—
Scott, William A., 4,684,485, Cl. 261-35.000.

Timmer, Hans H.; and Reichel, Wolfgang, to Ingenieurburo Timmer GmbH. System for controlling the temperature of rooms. 4,683,941, Cl. 165-47.000.

Timmer, Robert C.: *See—*
Cotter, David H.; Teerman, Richard F.; and Timmer, Robert C., 4,684,067, Cl. 239-533.300.

Ting, Sai-Pei: *See—*
Bates, Gary M.; Haaf, William R.; and Ting, Sai-Pei, 4,684,696, Cl. 525-68.000.

Tingley, William C. Boat guide. 4,684,145, Cl. 280-414.100.

Tipper Tie, Inc.: *See—*
Evans, Alfred J.; and Sarginger, Francis E., 4,683,700, Cl. 53-138.00R.

Titchenal, Oliver R., to Basic Packaging Systems, Inc. Square ended valve bag. 4,685,148, Cl. 383-37.000.

Tjenstrom, Brian: *See—*
Cohen, Mordehy; Bettenga, James L.; and Tjenstrom, Brian, 4,683,984, Cl. 184-6.200.

TMC Corporation: *See—*
Leichtfried, Friedrich; Wuerthner, Hubert; and Himmetsberger, Alois, 4,684,146, Cl. 280-626.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Inoue, Hiroshi; Miyazaki, Makoto; Isoi, Masaaki; and Yoda, Makoto, 4,684,578, Cl. 428-462.000.

Tobbe, William P.: *See—*
Kolenc, Terrence J.; Bork, Carl R., Jr.; Steiss, William C.; Shufflebarger, Earl D.; and Tobbe, William P., 4,684,106, Cl. 251-335.200.

Toida, Shouji: *See—*
Miyaji, Kenichi; Toida, Shouji; and Arai, Yoshinori, 4,684,057, Cl. 228-187.000.

Tokico Ltd.: *See—*
Tanabe, Hisao; Takahashi, Masaru; Ozawa, Hiroyasu; Machida, Shoichi; and Kitamura, Makoto, 4,683,993, Cl. 188-321.110.

Tokunaga, Ichiro: *See—*
Matsunaga, Hiroshi; Shimojima, Yoji; Tokunaga, Ichiro; and Obata, Kosei, 4,684,210, Cl. 350-96.200.

Tokuno, Masateru; and Sawada, Tetsuya, to Rengo Co., Ltd. Tool positioning device. 4,684,360, Cl. 493-367.000.

Tokuoka, Yasumichi; Yamakawa, Yoshisuke; and Watanabe, Akio, to TDK Corporation. Method of making a magnetic recording medium. 4,684,546, Cl. 427-130.000.

Tokyo Electric Co., Ltd.: *See—*
Matsushita, Tsuyoshi; Maekawa, Motoi; and Takahashi, Makoto, 4,684,275, Cl. 400-479.000.

Tokyo Gas Co., Ltd.: *See—*
Ohtsuga, Hisao; Morinaga, Akio; Sakaguchi, Yoichi; Hyodo, Masakatsu; and Yagi, Isaburo, 4,684,556, Cl. 428-36.000.

Tokyo Juki Industrial Co., Ltd.: *See—*
Kinoshita, Tomoaki; Takano, Kunio; Okiyama, Yoichi; and Tachikawa, Osamu, 4,683,827, Cl. 112-121.120.

Tolnar, Emil J., Jr.: *See—*
Clark, Roger A.; Doherty, Paul D.; and Tolnar, Emil J., Jr., 4,684,190, Cl. 439-587.000.

Tomcufcik, Andrew S.: *See—*
Wright, William B., Jr.; and Tomcufcik, Andrew S., 4,684,654, Cl. 514-259.000.

Tomczak, Roman M.; Evans, Alfred J.; Chen, Grant K. R.; and Brinson, Edward P., to Delaware Capital Formation, Inc. Shirring device. 4,683,615, Cl. 17-1.00R.

Tomkiewicz, Yaffa: *See—*
Donelon, John J.; Tomkiewicz, Yaffa; Wassick, Thomas A.; and Yeh, James T., 4,684,437, Cl. 156-643.000.

Tomoyori, Makoto: *See—*
Kando, Giichi; and Tomoyori, Makoto, 4,683,646, Cl. 29-611.000.

Tone, Hitoshi; Miyamoto, Hisashi; Ueda, Hiraki; and Nakagawa, Kazuyuki, to Otsuka Pharmaceutical Company Limited. Antimicrobial 1-substituted phenyl-4-oxoquinoline-3-carboxylic acid compounds and compositions thereof. 4,684,648, Cl. 514-249.000.

Tonelli, Claudio: *See—*
Marchionni, Giuseppe; Tonelli, Claudio; and Nicoletti, Alberto, 4,684,452, Cl. 204-157.940.

Tonner, Steven P.: *See—*
Parris, David; and Tonner, Steven P., 4,684,755, Cl. 585-257.000.

Topfl, Rosemarie, to Ciba-Geigy Corporation. Bisimidazolium salts. 4,684,736, Cl. 548-309.000.

Toppan Printing Co., Ltd.: *See—*
Masuda, Toshiro; Ishizuka, Kouichi; Fujita, Toshiji; and Kinoshita, Yoshio, 4,685,139, Cl. 382-1.000.

Topper, Robert J.: *See—*
Dischert, Robert A.; Ader, Joseph R.; and Topper, Robert J., 4,684,977, Cl. 358-31.000.

Toray Silicone Co., Ltd.: *See—*
Ona, Isao; Ozaki, Masaru; and Fujii, Tadashi, 4,684,709, Cl. 528-15.000.

Torres, Abraham, to International Business Machines Corporation. Dual incrementor. 4,685,078, Cl. 364-770.000.

Torterotot, Roland. Process for the preparation and heat treatment of food products. 4,684,531, Cl. 426-399.000.

Torti, Frank M.: *See—*
Larrick, James W.; Ringold, Gordon M.; Mark, David F.; Lin, Leo S.; and Torti, Frank M., 4,684,623, Cl. 514-12.000.

Toth, Jerome E.: *See—*
Ernst, Donald M.; and Toth, Jerome E., 4,683,940, Cl. 165-32.000.

Toumayan, Burton B., to Motorola, Inc. Incremental count display system. 4,685,116, Cl. 377-51.000.

Touryan, Kenell J.: *See—*
Hill, Gilman A.; Passamaneck, Richard S.; and Touryan, Kenell J., 4,683,943, Cl. 166-63.000.

Toyama Chemical Co., Ltd.: *See—*
Hori, Takako; Myokan, Isao; and Miyabara, Shinji, 4,684,631, Cl. 514-51.000.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Sakai, Yasushi; Tanaka, Koji; Saito, Michio; and Kiyohara, Akio, 4,684,711, Cl. 528-86.000.

Toyoda Jidoshokki Seisakusho: *See—*
Futamura, Kenichiro; and Ohtsu, Keiichiro, 4,683,804, Cl. 92-71.000.

Toyoshima, Masakatsu; Hideshima, Yasuhiro; and Fujita, Etsumi, to Sony Corporation. Digital terminal address transmitting for CATV. 4,684,981, Cl. 358-86.000.

Toyoshima, Masayasu: *See—*
Itoh, Katsuhisa; Watanabe, Yoshiaki; Nakamura, Eiji; and Toyoshima, Masayasu, 4,684,448, Cl. 204-71.000.

Toyota Jidosha Kabushiki Kaisha: *See—*
Mochizuki, Hiroyuki; Kobayashi, Nobuo; Inuzuka, Yutaka; Aiba, Shigeo; and Nishi, Setsuo, 4,683,769, Cl. 74-422.000.
Nishii, Michiharu; Furuta, Youichi; Tsubouchi, Kaoru; Murata, Takeo; Shibatani, Juichi; and Kiriyama, Takashi, 4,683,807, Cl. 92-169.000.
Osanai, Akinori; Niwa, Takao; and Gono, Takeshi, 4,683,779, Cl. 74-861.000.
Sasaki, Shoji, 4,684,319, Cl. 415-164.000.
Yokoyama, Fumitomo; Kuwayama, Yoshinari; Tatsuta, Mitsugu; and Kuramochi, Koujiro, 4,683,903, Cl. 137-56.000.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Sogo, Yoshitaka; Fukushima, Masami; and Kuzuya, Tetsuro, 4,683,771, Cl. 74-467.000.

Traenckner, Hans-Joachim: *See—*
Stahl, Hans G.; Hohlein, Peter; Traenckner, Hans-Joachim; Fleiter, Lothar; and Schwindt, Jurgen, 4,684,691, Cl. 524-534.000.

Tran, Hiep V., to Thomson Components-Mostek Corp. Memory cell leakage detection circuit. 4,685,086, Cl. 365-203.000.

Transportation Specialties, Inc.: *See—*
Hailey, Michael L., 4,683,728, Cl. 70-14.000.

Traub AG: *See—*
Kersten, Gunther; Klauss, Walter; and Michl, Jurgen, 4,683,786, Cl. 82-2.00B.

Travlos, Constantine M.: *See—*
Henderson, James A.; Travlos, Constantine M.; Ferris, David S.; Duddy, Gerald J.; and Mercier, Roland F., 4,683,636, Cl. 29-564.600.

Trears, Patrick J. Methods for the removal and/or prevention of build-up of slag and composition for use in said methods. 4,684,616, Cl. 501-49.000.

Treece, Harold O.: *See—*
Stepp, Lee W.; Baldridge, Morris G.; and Treece, Harold O., 4,683,955, Cl. 166-327.000.

Tregilgas, John H.; and Polgreen, Thomas L., to Texas Instruments Incorporated. Core annihilation method of $Hg_{1-x}Cd_xTe$. 4,684,415, Cl. 437-228.000.

Trenque, Pierre: *See—*
Vigneau, Jean-Louis; Trenque, Pierre; and Rivoire, Bruno, 4,683,905, Cl. 137-329.100.

Trimble, Harold: *See—*
Van Driesen, Roger P.; Adams, William R.; Caspers, John; Baldasarri, Mario; and Trimble, Harold, 4,684,456, Cl. 208-143.000.

Tripathy, Sukant K.: *See—*
Thakur, Mrinal K.; Tripathy, Sukant K.; and Sandman, Daniel J., 4,684,434, Cl. 156-622.000.

Trogler, William C.; and Jensen, Craig M., to University of California, The Regents of the. Catalytic compositions for preparing amides and primary alcohols. 4,684,751, Cl. 568-898.000.

Troncoso, Vincent F., to Golden Key-Futura, Inc. Compound archery bow. 4,683,865, Cl. 124-24.00R.

Tronzano, Sergio, to Ing. C. Olivetti & C., S.p.A. Locking and ejecting device for a recording and reproducing apparatus for magnetic discs. 4,685,010, Cl. 360-97.000.

Trubiano, Antoine, to Cari-All Inc. Shopping cart handle having an integral lock pin. 4,683,609, Cl. 16-114.00R.

Truchet, Bernard: *See—*
Pitrat, Alain; and Truchet, Bernard, 4,684,770, Cl. 200-67.00R.

True, Martin E. Spinner for use in connecting pipe joints. 4,683,962, Cl. 173-163.000.

Truehart, David C.: *See—*
Prokop, James A.; and Truehart, David C., 4,683,802, Cl. 91-516.000.

Trutter, Walter P., to General Motors Corporation. Locking device for a rear seat back rest. 4,684,175, Cl. 297-379.000.

Trutzschler GmbH & Co. KG: *See—*
Langen, Manfred; Temburg, Konrad; and Teichmann, Paul, 4,683,619, Cl. 19-159.00A.

TRW Inc.: *See—*
Chan, Daniel F., 4,684,880, Cl. 323-316.000.
Cybulsky, Michael; Piwonka, Thomas S.; and Brittain, Virgil R., 4,683,936, Cl. 164-122.100.
Jenkins, John W.; and Laubach, William F., 4,684,194, Cl. 439-260.000.
Swift, Gerald W.; and Stones, David I., 4,684,874, Cl. 333-125.000.

Tsay, Shung-Der. Portable thermos bottle with retractable suction tube. 4,684,032, Cl. 215-1.00A.

Tsubouchi, Kaoru: *See*—
Nishii, Michiharu; Furuta, Youichi; Tsubouchi, Kaoru; Murata, Takeo; Shibatani, Juichi; and Kiriyama, Takashi, 4,683,807, Cl. 92-169.000.
Tsubouchi, Toshiyuki; and Hata, Hitoshi, to Idemitsu Kosan Company Limited. Working fluid for traction drive. 4,684,754, Cl. 585-21.000.
Tsuchiya, Hiroshi; Morio, Kazuhiko; Murase, Hisashi; and Ohkawa, Kazuo, to Asahi Denka Kogyo K.K. Energy beam curable composition. 4,684,671, Cl. 522-31.000.
Tsui, Cyrus; Chan, Andrew K. L.; Chan, Albert; Fitzpatrick, Mark E.; and Ansari, Zahid, to Monolithic Memories, Inc. Output circuit for a programmable logic array. 4,684,830, Cl. 307-465.000.
Tsukii, Toshikazu: *See*—
Tajima, Yusuke; and Tsukii, Toshikazu, 4,684,965, Cl. 357-22.000.
Tsumura, Akio; Yamamoto, Suguru; and Miyaake, Chiharu, to Nitto Electric Industrial Co., Ltd. Apparatus and method for continuously measuring polarizing property. 4,684,256, Cl. 356-367.000.
Tsutsui, Akio, to Sharp Kabushiki Kaisha. CRT display unit. 4,684,987, Cl. 358-148.000.
Tsuzurahara, Mamoru; Baba, Hidetsuyo; and Kitakaze, Seiji, to Hitachi, Ltd. Magnetron cathode assembly with grooved insulating spacer. 4,684,845, Cl. 313-341.000.
Tula Silencers (Propriety) Limited: *See*—
Venter, Philippus, 4,683,978, Cl. 181-280.000.
Turc, Gerard: *See*—
Massit, Claude; Nicolas, Gerard; and Turc, Gerard, 4,684,181, Cl. 439-59.000.
Turk, Gijsbertus W.: *See*—
De Wit, Hendrik J.; Brouha, Marcel; Enz, Ulrich E.; Jager, Kornelis; Van Der Borst, Albertus J. C.; and Turk, Gijsbertus W., 4,685,012, Cl. 360-125.000.
Turner, Philip. Combination tic-tac-toe and question and answer game. 4,684,136, Cl. 273-271.000.
Tusco Manufacturing Co.: *See*—
Everett, Lynn E., 4,684,094, Cl. 248-245.000.
Tyjenski, Gerard M.: *See*—
Allgaier, Wayne F.; Tyjenski, Gerard M.; and Di Natale, Claude A., 4,684,432, Cl. 156-500.000.
Tyson, Ben B.: *See*—
Huffman, John W.; Picht, Brian J.; and Tyson, Ben B., 4,684,273, Cl. 400-247.000.
U.S.D. Corp.: *See*—
Hansen, Harmon R.; and Lingenfelter, Thomas A., 4,683,881, Cl. 128-204.260.
UBE Industries, Ltd.: *See*—
Ashitaka, Hidetomo; Jinda, Kazuya; and Miwa, Yoshiyuki, 4,684,717, Cl. 534-586.000.
Ashitaka, Hidetomo; Jinda, Kazuya; and Miwa, Yoshiyuki, 4,684,718, Cl. 534-586.000.
Uchida, Masahiro: *See*—
Hashimoto, Isao; Kinoshita, Tosuke; Uchida, Masahiro; and Uchiyama, Susumu, 4,684,069, Cl. 241-79.100.
Uchiyama, Nobuichi: *See*—
Hattori, Toshihiro; Uchiyama, Nobuichi; Asagi, Yasuyoshi; Ogawa, Noriaki; and Kasai, Hitoshi, 4,683,996, Cl. 192-0.033.
Uchiyama, Susumu: *See*—
Hashimoto, Isao; Kinoshita, Tosuke; Uchida, Masahiro; and Uchiyama, Susumu, 4,684,069, Cl. 241-79.100.
Uchiyama, Yoshihiro: *See*—
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.
Ueda, Hiraki: *See*—
Tone, Hitoshi; Miyamoto, Hisashi; Ueda, Hiraki; and Nakagawa, Kazuyuki, 4,684,648, Cl. 514-249.000.
Ueda, Kanji: *See*—
Haruna, Kazuo; Ueda, Kanji; and Uno, Masaru, 4,684,377, Cl. 55-26.000.
Ueda, Kazuhiko: *See*—
Matsuura, Masahiko; Doi, Nobuo; Yoshioka, Sadashichi; Okimoto, Haruo; and Ueda, Kazuhiko, 4,683,856, Cl. 123-436.000.
Ueda, Noriyoshi: *See*—
Tanioka, Hiroshi; and Ueda, Noriyoshi, 4,684,998, Cl. 358-293.000.
Ueno, Hideo, to Brother Kogyo Kabushiki Kaisha. Print head shifting apparatus for electronic typewriter or the like. 4,684,274, Cl. 400-320.000.
Ueno, Ryuzo; Sakota, Kazuyuki; and Nakamura, Yasunori, to Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo. Process for producing wholly aromatic polyesters. 4,684,712, Cl. 528-190.000.
Ueno, Toshio, to Kabushiki Kaisha Fuji Kikaku. Process for the preparation of iodizable calcium composition. 4,684,529, Cl. 426-237.000.
Ueno, Tsuneya: *See*—
Asari, Akira; Yamamura, Takashige; Hattori, Shigeo; and Ueno, Tsuneya, 4,683,630, Cl. 29-159.010.
Uhlig, Helmut: *See*—
Plainer, Hermann; Sproessler, Bruno; and Uhlig, Helmut, 4,684,525, Cl. 426-16.000.
Uhrick, Richard G. Combination of a table and equipment for cat litter. 4,683,839, Cl. 119-1.000.
Ultra-Centrifuge Nederland N.V.: *See*—
Luijten, Waltherus J. T. H.; and Moonen, Johannes J. E., 4,684,317, Cl. 415-73.000.
Umezawa, Norihiro; and Hata, Kazuyuki, to Mitsubishi Yuka Fine Chemicals Co., Ltd.; and Umezawa, Norihiro. Hydraulic cement composition and process for producing cement shapings. 4,684,407, Cl. 106-90.000.
Uniden Corp. of America: *See*—
George, David L.; and Benson, Raymond G., Jr., 4,684,870, Cl. 320-20.000.
Unima Maschinenbau GmbH: *See*—
Fetsch, Rudolf, 4,684,086, Cl. 248-68.100.
Union Carbide Corporation: *See*—
Gortsema, Frank P.; and Lok, Brent M. T., 4,684,511, Cl. 423-305.000.
Iya, Sridhar K., 4,684,513, Cl. 423-349.000.
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,684,617, Cl. 502-214.000.
Wagner, Burkhard E.; Karol, Frederick J.; Goeke, George L.; Jorgensen, Robert J.; and Friis, Nils, 4,684,703, Cl. 526-88.000.
Uniroyal Plastics Co., Inc.: *See*—
Worns, John R.; Chase, James W.; and Capriotti, Bruce W., 4,684,600, Cl. 430-271.000.
United Kingdom Atomic Energy Authority: *See*—
Bradshaw, Leslie, 4,683,752, Cl. 73-642.000.
United States Banknote Company L.P.: *See*—
Colgate, Gilbert, Jr., 4,684,795, Cl. 235-457.000.
United States of America
Air Force: *See*—
Starke, Roy R., 4,683,613, Cl. 16-262.000.
Watkins, Grant H.; and Staley, Lester K., 4,684,904, Cl. 331-117.00R.
Army: *See*—
Palazzolo, Faro D.; Drake, Brian L.; and Swanson, Ralph R., 4,683,801, Cl. 89-40.120.
Wittbrodt, Donald R., 4,683,797, Cl. 89-1.130.
Energy: *See*—
Granata, Samuel J., Jr.; and Woodle, Boyd M., 4,684,582, Cl. 429-39.000.
Ostenak, Carl A.; and Mackay, Harold A., 4,684,217, Cl. 350-319.000.
National Aeronautics and Space Administration: *See*—
Augason, Gordon C., 4,684,424, Cl. 156-163.000.
Rhodes, Marvin D., 4,684,156, Cl. 285-27.000.
Taylor, Allan H., 4,683,809, Cl. 92-208.000.
Webster, Christopher R., 4,684,258, Cl. 356-409.000.
Transportation: *See*—
Kalafus, Rudolph M., 4,684,949, Cl. 342-41.000.
U.S. Philips Corporation: *See*—
Baudry, Hugues, 4,684,543, Cl. 427-96.000.
Bertram, Leo; and Schemmann, Hugo, 4,684,840, Cl. 310-162.000.
Brouwer, Geert; and Wadman, Sipke, 4,684,251, Cl. 356-315.000.
Clasen, Rolf, 4,684,385, Cl. 65-17.000.
Clasen, Rolf, 4,684,386, Cl. 65-18.100.
Clasen, Rolf; and Hermann, Wilhelm G., 4,684,387, Cl. 65-18.400.
De Wit, Hendrik J.; Brouha, Marcel; Enz, Ulrich E.; Jager, Kornelis; Van Der Borst, Albertus J. C.; and Turk, Gijsbertus W., 4,685,012, Cl. 360-125.000.
Duchenois, Valere; Fouassier, Michele; and Baudry, Hugues, 4,684,846, Cl. 313-475.000.
Johannes, Kurt J., 4,684,988, Cl. 358-154.000.
Plagge, Joseph A. M., 4,684,871, Cl. 320-21.000.
Sanglier, Jean-Francois, 4,685,121, Cl. 379-90.000.
Scholten, Gerard J.; Beurskens, Theodorus J. G.; and Videc, Mathias F., 4,683,654, Cl. 29-832.000.
Spierings, Gijsbertus A. C. M.; and Van Hove, Eddy F. C., 4,684,847, Cl. 313-493.000.
Steenhof, Frits A.; Welles, Petrus W. G.; Nuijten, Petrus A. C. M.; and van der Meer, Jan, 4,684,986, Cl. 358-148.000.
Streit, Peter, 4,684,939, Cl. 340-784.000.
van der Vegte, Jan; and Hek, Dirk G., 4,684,212, Cl. 350-96.210.
Van Meurs, Johannes M., 4,684,851, Cl. 315-224.000.
Vis, Benjamin, 4,683,702, Cl. 53-433.000.
Vrijssen, Gerardus A. H. M.; and Van Gorkum, Aart A., 4,684,994, Cl. 358-217.000.
United States Steel Corporation: *See*—
Hamill, Paul E., Jr.; and Vance, Macy W., 4,683,937, Cl. 164-125.000.
United Technologies Corporation: *See*—
Field, Robert E., 4,684,323, Cl. 416-97.00R.
Kunz, Cleon V., 4,684,320, Cl. 415-190.000.
Picone, John D.; and Cronauer, Edward A., 4,684,821, Cl. 307-106.000.
United Water Resources, Inc.: *See*—
Reiter, Stuart L., 4,684,920, Cl. 340-310.00A.
Unitron, Inc.: *See*—
Severinsky, Alexander J., 4,685,042, Cl. 363-41.000.
Universal Extension Corporation: *See*—
Richards, John O.; and Graef, John, 4,683,610, Cl. 16-115.000.
University of California, The Regents of the: *See*—
Feinberg, David A., 4,684,891, Cl. 324-309.000.
Trogler, William C.; and Jensen, Craig M., 4,684,751, Cl. 568-898.000.
University of Minnesota, Regents of the: *See*—
Franciosi, Alfonso, 4,684,541, Cl. 437-173.000.
University of Nebraska, The Board of Regents of the: *See*—
Solie, John B.; Wittmuss, Howard D.; and Burnside, Orvin C., 4,683,826, Cl. 111-7.000.
University of Strathclyde: *See*—
Jackson, John; and Angadjivand, Seyed A., 4,684,481, Cl. 252-510.000.

Uno, Masaru: *See*—
Haruna, Kazuo; Ueda, Kanji; and Uno, Masaru, 4,684,377, Cl. 55-26.000.
Upjohn Company, The: *See*—
Evans, Timothy W., 4,684,610, Cl. 435-61.000.
Tiffany, Burris D.; Nichols, Steve; Meulman, Paul A.; Hylton, Thomas A.; and Lipton, Michael F., 4,684,725, Cl. 540-565.000.
Urakawa, Shigeki; and Inomata, Noriyuki, to Takara Co., Ltd. Automobile having selective drive wheels. 4,684,355, Cl. 446-464.000.
Uratani, Munehiro, to Sharp Kabushiki Kaisha. CMOS tree decoder with speed enhancement by adjustment of gate width. 4,684,829, Cl. 307-449.000.
Urbach, Hansjorg: *See*—
Henning, Rainer; and Urbach, Hansjorg, 4,684,662, Cl. 548-452.000.
Uriuhara, Makoto; and Ohmori, Atsushi, to Isuzu Motors Limited. Start control method for automatic clutch. 4,685,062, Cl. 364-424.100.
Usuda, Eiji: *See*—
Hattori, Kiyoshi; and Usuda, Eiji, 4,685,053, Cl. 364-184.000.
Utsugi, Mikio, to Fuji Photo Film Co., Ltd. Photographic camera. 4,684,229, Cl. 354-106.000.
Uzrad, Mordechai. Flexible tube sprinkler. 4,684,066, Cl. 239-229.000.
V. M. International, Inc.: *See*—
Vergel, Jorge, Jr., 4,683,724, Cl. 62-85.000.
Vaclavik, Edwin W.: *See*—
Breach, William D.; and Vaclavik, Edwin W., 4,684,687, Cl. 524-291.000.
Vahabzadeh, Hamid, to General Motors Corporation. Continuously variable transmission and control. 4,684,358, Cl. 474-148.000.
Valencia, Vance I., to Maxwell Laboratories, Inc. Symmetrically charged pulse-forming circuit. 4,684,820, Cl. 307-106.000.
Valentin, Peter: *See*—
Laske, Gerd; and Valentin, Peter, 4,683,667, Cl. 34-203.000.
Valentine, William, to Dynagram Corporation of America. Quick-liquifying, chewable tablet. 4,684,534, Cl. 427-3.000.
Valmet Oy: *See*—
Kerttula, Reima; and Viitanen, Olavi, 4,684,443, Cl. 162-255.000.
Valsecchi, Carlo; Piatti, Franco; and Bazzi, Giuseppe B. Safety closure device particularly for ski boots. 4,683,620, Cl. 24-71.0SK.
Valtion Teknillinen Tutkimuskeskus: *See*—
Manninen, Markku; and Halme, Aarne, 4,685,054, Cl. 364-191.000.
Valutec AG: *See*—
Meyer, Bruno, 4,684,149, Cl. 280-650.000.
Vance, Macy W.: *See*—
Hamill, Paul E., Jr.; and Vance, Macy W., 4,683,937, Cl. 164-125.000.
Van Der Borst, Albertus J. C.: *See*—
De Wit, Hendrik J.; Brouha, Marcel; Enz, Ulrich E.; Jager, Kornelis; Van Der Borst, Albertus J. C.; and Turk, Gijsbertus W., 4,685,012, Cl. 360-125.000.
van der Lely, Cornelis. Computer with universal input member for use on stationary and mobile platforms. 4,684,089, Cl. 248-124.000.
van der Meer, Jan: *See*—
Steenhof, Frits A.; Welles, Petrus W. G.; Nuijten, Petrus A. C. M.; and van der Meer, Jan, 4,684,986, Cl. 358-148.000.
Vanderpool, Clarence D.: *See*—
Ladd, Judith A.; and Vanderpool, Clarence D., 4,684,401, Cl. 75-0.5BA.
van der Put, Henk A., to Laser Magnetic Storage International Company. Power control system for a semiconductor laser. 4,685,097, Cl. 369-54.000.
van der Vegte, Jan; and Hek, Dirk G., to U.S. Philips Corporation. Detachable optical connector. 4,684,212, Cl. 350-96.210.
Van Driesen, Roger P.; Adams, William R.; Caspers, John; Baldasarri, Mario; and Trimble, Harold, to Lummus Crest Inc. Control of bed expansion in expanded bed reactor. 4,684,456, Cl. 208-143.000.
Van Dyke, Ted J., Jr., to Rayovac Corporation. Battery seal. 4,684,589, Cl. 429-184.000.
Van Gorkum, Aart A.: *See*—
Vrijssen, Gerardus A. H. M.; and Van Gorkum, Aart A., 4,684,994, Cl. 358-217.000.
Van Hove, Eddy F. C.: *See*—
Spierings, Gijsbertus A. C. M.; and Van Hove, Eddy F. C., 4,684,847, Cl. 313-493.000.
VanKerkhove, Alan P.: *See*—
Lelental, Mark; Lee, James K.; and VanKerkhove, Alan P., 4,684,602, Cl. 430-363.000.
Van Meurs, Johannes M., to U.S. Philips Corporation. DC/AC converter for feeding a metal vapor discharge tube. 4,684,851, Cl. 315-224.000.
Van Ryswyk, Wilbur, to Vermeer Manufacturing Co. Baler machine with a bale transfer conveyor. 4,683,815, Cl. 100-88.000.
Varian Associates, Inc.: *See*—
Wells, Gregory J., 4,684,807, Cl. 250-381.000.
Varitronic Systems, Inc.: *See*—
McGourty, Thomas K.; and McGourty, Lawrence F., 4,683,820, Cl. 101-93.360.
Varker, Charles J.; Wilson, Syd R.; and Burnham, Marie E., to Motorola, Inc. Forming depthwise isolation by selective oxygen/nitrogen deep implant and reaction annealing. 4,683,637, Cl. 437-63.000.
Vasko, Kent A.: *See*—
Vasko, Tanya S.; and Vasko, Kent A., 4,683,709, Cl. 54-66.000.
Vasko, Tanya S.; and Vasko, Kent A., to Vasko, Tanya S.; and Vasko, Kent A. Saddle pad. 4,683,709, Cl. 54-66.000.
Vasseur, Jean-Pierre: *See*—
Barrere, Genevieve C.; Beydon, Marie-Helene; Drugeault, Lionel; and Vasseur, Jean-Pierre, 4,684,613, Cl. 435-301.000.
Vassiliou, Eustathios, to Du Pont de Nemours, E. I., and Company. Thixotropic material coating apparatus, distributor device and method. 4,684,551, Cl. 427-345.000.
Vassoughi, Sohrab: *See*—
Dalebout, William T.; Vassoughi, Sohrab; Martinell, William J.; Rohrer, David C.; Martinell, Steven W.; and Marchant, Robert L., 4,684,126, Cl. 272-134.000.
Vataru, Marcel; and Schenach, Thomas A., to Wynn Oil Company. Gasoline additive composition. 4,684,373, Cl. 44-63.000.
Vaughan, Daniel J. Purification of dye baths. 4,684,453, Cl. 204-182.400.
Vayko, Don. Ladder-leveling device. 4,683,980, Cl. 182-108.000.
VDO Adolf Schindling AG: *See*—
Pfalzgraf, Manfred, 4,683,778, Cl. 74-858.000.
Vector Laboratories, Inc.: *See*—
Hsu, Su-Ming, 4,684,609, Cl. 435-7.000.
Vegla Vereinigte Glaswerke GmbH: *See*—
Kunert, Heinz; and Jbach, Hermann-Wolf, 4,684,571, Cl. 428-314.800.
Velencei, John. Two-piston internal combustion engine (JV-2). 4,683,845, Cl. 123-73.0PP.
Velten & Pulver, Inc.: *See*—
Schneider, Thomas C., 4,684,011, Cl. 198-779.000.
Venter, Philippus, to Tula Silencers (Propriety) Limited. Exhaust silencer. 4,683,978, Cl. 181-280.000.
Vergel, Jorge, Jr., to V. M. International, Inc. Refrigeration moisture eliminating device and method. 4,683,724, Cl. 62-85.000.
Vermeer Manufacturing Co.: *See*—
Van Ryswyk, Wilbur, 4,683,815, Cl. 100-88.000.
Vermont Castins, Inc.: *See*—
Ferguson, Robert W.; Andors, Derik K.; and Reed, E. Smith, Jr., 4,683,868, Cl. 126-193.000.
Verstraeten, Achiel, to Elektro Automaten Verstraeten p.v.b.a. Grab for slot machines. 4,684,128, Cl. 273-1.0GC.
VerWeire, James R.: *See*—
Armer, Leon N., Jr.; Antonio, Joseph M.; Roth, Craig A.; and VerWeire, James R., 4,684,137, Cl. 273-428.000.
Veser, Franz. Device for the installation of the coils into the stator of electrical machines. 4,683,650, Cl. 29-736.000.
Vezirian, Edward; and Hinton, Earle L. Vending package. 4,684,015, Cl. 206-19.000.
Vianova Kunstharz, A.G.: *See*—
Paar, Willibald; Pampouchidis, Georg; and Honig, Helmut, 4,684,702, Cl. 525-528.000.
Victor Company of Japan: *See*—
Kitamura, Masatsugu; Wagatsuma, Kikuji; Watanabe, Tokumi; Yamashita, Naoki; and Yoshida, Hiroshi, 4,683,795, Cl. 84-1.260.
Videc, Mathias F.: *See*—
Scholten, Gerard J.; Beurskens, Theodorus J. G.; and Videc, Mathias F., 4,683,654, Cl. 29-832.000.
Vigneau, Jean-Louis; Trenque, Pierre; and Rivoire, Bruno, to Duffour et Igon S.A. (D.I.). Fluid distribution connector, in particular for hospitals. 4,683,905, Cl. 137-329.100.
Viitanen, Olavi: *See*—
Kerttula, Reima; and Viitanen, Olavi, 4,684,443, Cl. 162-255.000.
Vis, Benjamin, to U.S. Philips Corporation. Method for vacuum-packaging finely divided materials, and a bag for implementing the method. 4,683,702, Cl. 53-433.000.
Viskase Corporation: *See*—
Raudys, Vytas A., 4,683,617, Cl. 17-41.000.
Vitringa, Frederick A.; and Hagedoorn, Arend L., to Geosource Inc. Lateral compliance device for geophone springs. 4,685,094, Cl. 367-183.000.
Voest-Alpine Aktiengesellschaft: *See*—
Fastner, Thorwald; Mayrhofer, Max; and Taschner, Walter, 4,684,053, Cl. 228-158.000.
von Gunten, Marc K.: *See*—
DeBell, Gary W.; Wright, David L.; Ruddock, Kenneth A.; Petersen, Alan B.; Carlson, Lee R.; and von Gunten, Marc K., 4,685,110, Cl. 372-103.000.
von Struensee, Detlef: *See*—
Lipp, Alfred; Reinmuth, Klaus; and von Struensee, Detlef, 4,684,480, Cl. 252-478.000.
Vorachek, Michael J.; Entringer, Guy P.; Meives, Otis E.; Lynch, Gary L.; and Lutzke, Anthony J., to Pemco, Inc. Method of and apparatus for wrapping. 4,683,704, Cl. 53-461.000.
Vrijssen, Gerardus A. H. M.; and Van Gorkum, Aart A., to U.S. Philips Corporation. Television camera tube with honeycomb grid electrode. 4,684,994, Cl. 358-217.000.
Vulcan Tool Company: *See*—
Horn, Charles; Kelly, Rickey L.; Orendorf, Thomas E.; and Kiger, Terry L., 4,684,309, Cl. 414-224.000.
Vuorinen, Olavi: *See*—
Kukka, Aarre; Tervamaki, Jukka; Nikulin, Heikki; and Vuorinen, Olavi, 4,684,250, Cl. 356-246.000.
W. R. Grace & Co.: *See*—
Welsh, William A.; Parent, Yves O.; and Mertz, Stanley A., 4,684,530, Cl. 426-330.400.
W. R. Grace & Co., Cryovac Div.: *See*—
Mueller, Walter B.; and Schirmer, Henry G., 4,684,573, Cl. 428-349.000.
W. Schlafhorst & Co.: *See*—
Peters, Erwin, 4,683,712, Cl. 57-81.000.
Waagner-Biro Aktiengesellschaft: *See*—
Hillinger, Bruno; and Beckmann, Georg, 4,684,374, Cl. 48-197.00R.

Wacker, Erich; Landau, Ulrich; Sander, Wilfried; and Schellmann, Klaus, to Kolbenschmidt Aktiengesellschaft. Light alloy piston for internal combustion engines. 4,683,808, Cl. 92-208.000.

Wada, Katsuo: *See—*
Iizuka, Nobuyuki; Hisano, Katsukuni; Oshima, Ryoichiro; Wada, Katsuo; Hirose, Fumiyuki; Kuroda, Michio; Uchiyama, Yoshihiro; Ishibashi, Yoji; Sato, Isao; and Inose, Hiroshi, 4,683,715, Cl. 60-39.060.

Wadia, Aspi B.: *See—*
Hakenewerth, Paul A.; Wadia, Aspi B.; Walker, James R.; and White, James M., 4,684,802, Cl. 250-235.000.

Wadman, Sipke: *See—*
Brouwer, Geert; and Wadman, Sipke, 4,684,251, Cl. 356-315.000.

Waechter, Manfred: *See—*
Driscoll, Carleton D.; Najm, Elie M.; and Waechter, Manfred, 4,685,020, Cl. 361-18.000.

Wagatsuma, Kikuji: *See—*
Kitamura, Masatsugu; Wagatsuma, Kikuji; Watanabe, Tokumi; Yamashita, Naoki; and Yoshida, Hiroshi, 4,683,795, Cl. 84-1.260.

Wagner, Burkhard E.; Karol, Frederick J.; Goeke, George L.; Jorgensen, Robert J.; and Friis, Nils, to Union Carbide Corporation. Polymerization catalyst for ethylene homopolymerization. 4,684,703, Cl. 526-88.000.

Wagner, Earl F.; and Smith, Charles M., to General Motors Corporation. Quick change mold insert. 4,684,101, Cl. 249-144.000.

Wagner, Kuno: *See—*
Mohring, Edgar; Muller, Hanns P.; Roessler, Peter; Wagner, Kuno; and Tietz, Helmut, 4,684,728, Cl. 544-182.000.

Wagner, Robert J.: *See—*
Fey, Edmond O.; Haselbauer, Peter; Jung, Dae Y.; Kaschak, Ronald A.; Kilthau, Hans-Dieter; Magnuson, Roy H.; and Wagner, Robert J., 4,684,545, Cl. 427-98.000.

Wainerdi, James C.: *See—*
Chung, Jing-Yau; Chen, Sen-Tsuen; Wainerdi, James C.; and Miller, Mark A., 4,685,091, Cl. 367-31.000.

Walker, James R.: *See—*
Hakenewerth, Paul A.; Wadia, Aspi B.; Walker, James R.; and White, James M., 4,684,802, Cl. 250-235.000.

Walker, Michael L.; Ford, William G. F.; Dill, Walter R.; and Gdanski, Ricky D., to Halliburton Company. Composition and method of stimulating subterranean formations. 4,683,954, Cl. 166-307.000.

Wallat, Siegfried: *See—*
Moeller, Hinrich; and Wallat, Siegfried, 4,684,665, Cl. 514-543.000.

Walter, Karl, to G. Siempelkamp GmbH & Co. Process for making a composite wood panel. 4,684,489, Cl. 264-101.000.

Walton, Paul G.; and Little, Percy A. Triangular oil well drill bit for use in unconsolidated formations. 4,683,965, Cl. 175-385.000.

Walz, Dieter: *See—*
Breitkreuz, Helmut; Clement, Albrecht; Mayer, Dieter; Ruppmann, Claus; Walz, Dieter; Wild, Ernst; and Zechnall, Martin, 4,683,861, Cl. 123-520.000.

Walzen-Irle GmbH: *See—*
Schonemann, Joachim, 4,683,628, Cl. 29-116.00R.

Wang, Chun S.; Chen, Wuu N.; Bowden, Robert L.; and Berman, Jody R., to Dow Chemical Company, The. Advanced epoxy resins prepared from triglycidyl ethers and dihydri phenols. 4,684,700, Cl. 525-481.000.

Wang, Chun S.; Bowden, Robert L.; and Chen, Wuu N., to Dow Chemical Company, The. Method for preparing advanced epoxy or phenoxy resins with low aliphatic halide content. 4,684,701, Cl. 525-507.000.

Wang Laboratories, Inc.: *See—*
Arney, Michel D.; and LaCount, Clifford E., 4,684,185, Cl. 439-502.000.
Cheung, Kin L.; and Einarson, Jeffrey W., 4,685,082, Cl. 365-49.000.

Wang, Sherman S.: *See—*
DiStefano, Thomas H.; Hollis, Ralph L., Jr.; Johnson, Mark; and Wang, Sherman S., 4,684,547, Cl. 427-131.000.

Warabisako, Terunori: *See—*
Kimura, Shin-Ichiro; Murakami, Eiichi; Warabisako, Terunori; Miyake, Kiyoshi; and Sunami, Hideo, 4,683,838, Cl. 118-715.000.

Warburg, Richard J. Microcentrifuge tube opener. 4,683,782, Cl. 81-3.570.

Ward Machinery Company, The: *See—*
Sardella, Louis M.; West, John B.; Harrison, John R.; and Parr, Dennis J., 4,683,822, Cl. 101-382.0MV.

Ward, Thomas A.: *See—*
Schimmel, Karl F.; Ward, Thomas A.; and Seiner, Jerome A., 4,684,710, Cl. 528-26.000.

Warner, Fredrick A.: *See—*
Till, Henry R.; Warner, Fredrick A.; and Radulski, Charles A., 4,684,238, Cl. 355-10.000.

Warner & Swasey Company, The: *See—*
Furmanek, Robert A.; Mukherjee, Jyoti P.; and Lanese, Pasquale J., 4,684,266, Cl. 384-37.000.

Wasko, Andrew J. Hand implement support apparatus. 4,684,559, Cl. 428-100.000.

Wassell, Mark E.; and Mosimann, John G., to Terry Corporation. Bladed rotor assembly, and method of forming same. 4,684,326, Cl. 416-215.000.

Wasserstrom, Henry; and Kennedy, Richard T., to Coca-Cola Company, The. Beverage dispenser valve assembly system for use with pulpy citrus concentrate. 4,684,039, Cl. 222-129.100.

Wassick, Thomas A.: *See—*
Donelon, John J.; Tomkiewicz, Yaffa; Wassick, Thomas A.; and Yeh, James T., 4,684,437, Cl. 156-643.000.

Wasylyniuk, Ralph E. Chemical filter for use in a cab ventilation system. 4,684,381, Cl. 55-316.000.

Watanabe, Akio: *See—*
Tokuoka, Yasumichi; Yamakawa, Yoshisuke; and Watanabe, Akio, 4,684,546, Cl. 427-130.000.

Watanabe, Hiroaki, to Fuji Kagakushi Kogyo Co., Ltd. Spool for correction tape assembly. 4,684,272, Cl. 400-242.000.

Watanabe, Hirokazu, to Nippon Notion Kogyo Co., Ltd. Flexible button. 4,683,621, Cl. 24-95.000.

Watanabe, Koichi: *See—*
Maesaka, Michinobu; Watanabe, Koichi; and Murata, Michihiro, 4,683,639, Cl. 29-570.100.

Watanabe, Nobuhisa; Iwamoto, Hisao; Nasuno, Toshihiro; and Sakamaki, Yoshio, to Kanebo Limited; and Yoshida Industry Co., Limited. Compact case. 4,684,017, Cl. 206-235.000.

Watanabe, Shunso F., to Ford Motor Company. Vehicle suspension damper with remote control. 4,683,992, Cl. 188-299.000.

Watanabe, Tokumi: *See—*
Kitamura, Masatsugu; Wagatsuma, Kikuji; Watanabe, Tokumi; Yamashita, Naoki; and Yoshida, Hiroshi, 4,683,795, Cl. 84-1.260.

Watanabe, Yoshiaki: *See—*
Itoh, Katsuhisa; Watanabe, Yoshiaki; Nakamura, Eiji; and Toyoshima, Masayasu, 4,684,448, Cl. 204-71.000.

Watanabe, Yoshimi; and Yamashita, Kazuya, to Honda Giken Kogyo Kabushiki Kaisha. Outboard engine structure. 4,684,351, Cl. 440-89.000.

Watkins, Grant H.; and Staley, Lester K., to United States of America, Air Force. Low phase noise two port voltage controlled oscillator. 4,684,904, Cl. 331-117.00R.

Watson, Alan R.; and Bryson, Michael A., to Electrovoice, Inc. Microphone with non-symmetrical directivity pattern. 4,685,137, Cl. 381-174.000.

Watson, William K. Heterodyne system for electric power generation. 4,684,813, Cl. 290-4.00A.

Wean United Rolling Mills, Inc.: *See—*
Ginzburg, Vladimir B.; and Kaplan, Naum M., 4,683,744, Cl. 72-243.000.

Weatherford/Lamb, Inc.: *See—*
Luth, Royse I., 4,684,314, Cl. 414-745.000.

Webasto-Werk W. Baier GmbH & Co.: *See—*
Igel, Richard; and Lutz, Alfons, 4,684,169, Cl. 296-221.000.

Webb, Monty F.: *See—*
Norris, Richard G.; Webb, Monty F.; and Le, Vinh Q., 4,685,120, Cl. 379-26.000.

Weber, Frank J., to Ralston Purina Company. Carton with pour spout. 4,684,058, Cl. 229-17.00R.

Weber, Frederick C., to General Motors Corporation. Ball joint. 4,684,279, Cl. 403-136.000.

Weber, Kurt: *See—*
Artz, Klaus; Meyer, Hans R.; Reinehr, Dieter; and Weber, Kurt, 4,684,744, Cl. 558-388.000.

Weber, Robert: *See—*
Kunz, Rainer; Stauner, Jakob; and Weber, Robert, 4,684,492, Cl. 376-203.000.

Weber, Robert N.; and Stape, William J., to AMP Incorporated. Fiber optic cable puller. 4,684,211, Cl. 350-96.200.

Weber, Walter: *See—*
Boss, Heinz; and Weber, Walter, 4,684,118, Cl. 270-58.000.

Webster, Christopher R., to United States of America, National Aeronautics and Space Administration. Method and apparatus for enhancing laser absorption sensitivity. 4,684,258, Cl. 356-409.000.

Webster Spring Co. Inc.: *See—*
Hagemeister, Robert C., 4,684,111, Cl. 267-103.000.

Weckenbrock, Hermann J.: *See—*
Roeder, Barbara J.; Harwood, Leopold A.; and Weckenbrock, Hermann J., 4,684,989, Cl. 358-167.000.

Weibelzahl, Manfred; Wild, Georg; and Sadek, Kadry, to Siemens Aktiengesellschaft. Method and apparatus for suppressing resonance phenomena in the A-C network on the inverter side of a high voltage D-C transmission system. 4,685,044, Cl. 363-51.000.

Weidler, Charles H.: *See—*
Feher, Michael S.; Weidler, Charles H.; and Wise, James H., 4,684,191, Cl. 439-246.000.

Weihrich, Georg; and Wohld, Dietrich, to Siemens Aktiengesellschaft. Process and device for compensation of the effect of roll eccentricities. 4,685,063, Cl. 364-472.000.

Weil, George, to David R. Webb Co., Inc. Slicer dogs for thirds and quarters. 4,683,926, Cl. 144-178.000.

Weinerman, Lee S.; Rachocki, Michael J.; and Giarrizzo, John E., to Eastern Company, The. Cabinet lock with recessed handle. 4,683,736, Cl. 70-208.000.

Weinschel Engineering: *See—*
Capek, George, 4,684,905, Cl. 333-81.00R.

Weisenfelder, Carl H., to IRI International Corporation. Shifting apparatus for a drawworks transmission. 4,683,994, Cl. 192-3.610.

Weishaupt, Walter, to Bayerische Motoren Werke AG. Testing method for ignition systems of internal combustion engines in motor vehicles. 4,684,896, Cl. 324-399.000.

Weiss, Steven: *See—*
Ma, John; and Weiss, Steven, 4,684,858, Cl. 318-317.000.

Welles, Petrus W. G.: *See—*
Steenhof, Frits A.; Welles, Petrus W. G.; Nuijten, Petrus A. C. M.; and van der Meer, Jan, 4,684,986, Cl. 358-148.000.

Welling, Peter A., to Charles Stark Draper Laboratory, Inc., The. Waveform modulation system. 4,685,114, Cl. 375-22.000.

Wellman, Russel E.; and Cuming, Phyllis A., to Pitney Bowes Inc. Thermal transfer ribbon including an amorphous polymer. 4,684,271, Cl. 400-241.100.

Wells, Gregory J., to Varian Associates, Inc. Flow contoured electron capture detector cell. 4,684,807, Cl. 250-381.000.

Wells, Wayne E.: *See*—
Sale, Robert F.; and Wells, Wayne E., 4,684,110, Cl. 267-52.000.

Welsh, William A.; Parent, Yves O.; and Mertz, Stanley A., to W. R. Grace & Co. Adsorption of proteins from fluids. 4,684,530, Cl. 426-330.400.

Welzel, Peter; Kunisch, Franz; Stein, Hermann; Hiltmann nee Ponty, Aranka; and Kruggel, Frithjof, to Hoechst Aktiengesellschaft. Moenomycin a derivatives and their use as antibiotics. 4,684,626, Cl. 514-25.000.

Wendel, Armin: *See*—
Schulz, Volker; Leyck, Sigurd; Durr, Manfred; Ghyczy, Miklos; Wendel, Armin; and Hager, Jorg, 4,684,632, Cl. 514-78.000.

Wenzel, Kenneth H., to Maxi-Torque Drill Systems, Inc. Downhole drill bit drive apparatus. 4,683,964, Cl. 175-107.000.

Werjefelt, Bertil, to Du Pont de Nemours, E. I., and Company. Toxic fume protective hood and method of construction. 4,683,880, Cl. 128-201.280.

Werner & Pfleiderer: *See*—
Rudolph, Joachim, 4,684,488, Cl. 264-40.200.

West, John B.: *See*—
Sardella, Louis M.; West, John B.; Harrison, John R.; and Parr, Dennis J., 4,683,822, Cl. 101-382.0MV.

West, Peter. Airbrush guidance system. 4,683,836, Cl. 118-305.000.

Westebbe, Klaus: *See*—
Keintzel, Gunter; and Westebbe, Klaus, 4,683,842, Cl. 122-483.000.

Westercamp, Kenneth L.; Kurecka, Donald J.; and Yeack, David C., to General Motors Corporation. Concentric motor electric power steering for rack and pinion gear with center take-off. 4,683,971, Cl. 180-79.100.

Westinghouse Electric Corp.: *See*—
Antoszewski, Richard S.; and Soroka, Daniel P., 4,684,312, Cl. 414-735.000.
Chubb, Walston, 4,684,497, Cl. 376-419.000.
Colimitra, Thomas A., 4,683,772, Cl. 74-479.000.
Dadpey, Habib; and Shero, David J., 4,684,868, Cl. 318-802.000.
Gjertsen, Robert K.; and Wilson, John F., 4,684,499, Cl. 376-446.000.
Gjertsen, Robert K.; Shallenberger, John M.; and Wilson, John F., 4,684,500, Cl. 376-446.000.
Henderson, James A.; Travlos, Constantine M.; Ferris, David S.; Duddy, Gerald J.; and Mercier, Roland F., 4,683,636, Cl. 29-564.600.
Lui, Chun K., 4,684,501, Cl. 376-446.000.
Neft, Charles L., 4,685,049, Cl. 363-159.000.
Paul, Gary E., 4,684,498, Cl. 376-446.000.
Pillage, Lawrence T.; and Anderson, Arthur A., 4,683,989, Cl. 187-121.000.
Rylatt, John A., 4,684,491, Cl. 376-203.000.
Shallenberger, John M., 4,684,503, Cl. 376-446.000.
Thurlow, Norman C.; and Hruda, Robert M., 4,683,749, Cl. 73-40.700.
Wilson, John F.; Gjertsen, Robert K.; and Cerni, Samuel, 4,684,495, Cl. 376-352.000.
Wilson, John F.; and Barry, Robert F., 4,684,496, Cl. 376-352.000.
Wilson, John F.; and Gjertsen, Robert K., 4,684,502, Cl. 376-446.000.
Wilson, John F.; Gjertsen, Robert K.; and Ferrari, Harry M., 4,684,504, Cl. 376-447.000.

Westland, William F., to Lex Computing & Management Corporation. Video composition method and apparatus for providing simultaneous inputting and sorting of video source material. 4,685,003, Cl. 360-14.100.

Westropp, Hilary A., to Westropp, Hilary Ann. Protective equipment for horses. 4,683,710, Cl. 54-82.000.

Westropp, Hilary Ann: *See*—
Westropp, Hilary A., 4,683,710, Cl. 54-82.000.

Westvaco Corporation: *See*—
Broughman, John D., Jr.; Calvert, Barry G.; and Hill, Danny B., 4,683,745, Cl. 73-49.200.

Weyer, Paul P. Rotary actuator with backlash elmination. 4,683,767, Cl. 74-409.000.

Weyerhaeuser Company: *See*—
Meredith, Michael D.; Bentvelzen, Joseph M.; and Jordan, Marvin F., 4,684,442, Cl. 162-242.000.

Wheatley, Charles E., III: *See*—
Hunt, Eugene V.; Mosley, Charles G.; and Wheatley, Charles E., III, 4,684,903, Cl. 331-78.000.

Wheatley, William M.: *See*—
Norcia, John A.; Wheatley, William M.; and Norcia, Michael D., 4,683,843, Cl. 123-1.00A.

Wheeler, Charles F.: *See*—
LaGrange, Nyle D.; Nielsen, Darryl M.; and Wheeler, Charles F., 4,684,331, Cl. 417-366.000.

Whitaker, Charles D., to Ketek Inc. Vehicle movement monitoring system. 4,685,061, Cl. 364-424.000.

White, Donald R.; and Harrison, Michael R., to Maxon Electronics Co. Ltd. Method and apparatus for duplex communications. 4,685,099, Cl. 370-30.000.

White, James M.: *See*—
Hakenewerth, Paul A.; Wadia, Aspi B.; Walker, James R.; and White, James M., 4,684,802, Cl. 250-235.000.

Whitehead Engineered Products, Inc.: *See*—
Bucci, George H., 4,683,864, Cl. 123-575.000.

Whiteley, John, to Hollingsworth UK Ltd. Fluid-operated ram. 4,684,074, Cl. 242-18.0DD.

Whitney, Harry B.: *See*—
Miller, Ralph A.; and Whitney, Harry B., 4,684,079, Cl. 244-137.200.

Wichmann, James W.: *See*—
Higginbotham, Clark A.; and Wichmann, James W., 4,684,677, Cl. 523-435.000.

Wicker, Ralph C., to Secure Images Inc. Secure and self-verifiable image. 4,684,593, Cl. 430-6.000.

Wickman, John A.; and Killian, John J., III, to American Tourister, Inc. Latching device. 4,683,731, Cl. 70-69.000.

Wiebus, Ernst: *See*—
Kessen, Gunther; Cornils, Boy; Gick, Wilhelm; Wiebus, Ernst; Hibbel, Joseph; Bach, Hanswilhelm; and Zgorzelski, Wolfgang, 4,684,750, Cl. 568-883.000.

Wiedmann, Herr H.: *See*—
Gaul, Herr K.; Mogler, Herr J.; and Wiedmann, Herr H., 4,684,038, Cl. 222-89.000.

Wilcox, Robert B. Breath transfer device. 4,683,869, Cl. 126-204.000.

Wild, Ernst: *See*—
Breitkreuz, Helmut; Clement, Albrecht; Mayer, Dieter; Ruppmann, Claus; Walz, Dieter; Wild, Ernst; and Zechnall, Martin, 4,683,861, Cl. 123-520.000.

Wild, Georg: *See*—
Weibelzahl, Manfred; Wild, Georg; and Sadek, Kadry, 4,685,044, Cl. 363-51.000.

Wilde, Ronald J.: *See*—
Booth, Thomas L.; Schlaps, Edgar H.; and Wilde, Ronald J., 4,683,975, Cl. 180-289.000.

Wildemeersch, Dirk A. A. Instrument for suprapubic drainage of the bladder, inserted through the urethra. 4,684,369, Cl. 604-272.000.

Willett International Limited: *See*—
Ball, Jeffrey M., 4,684,956, Cl. 346-1.100.

Williams, R. Tudor. Dual function connector for use with endotracheal apparatus. 4,683,879, Cl. 128-200.260.

Willmar Poultry Company, Inc.: *See*—
Huisinga, Richard D.; and Norling, Rayburn E., 4,683,811, Cl. 98-42.200.

Wilson, John F.; Gjertsen, Robert K.; and Cerni, Samuel, to Westinghouse Electric Corp. Fuel assembly bottom nozzle with integral debris trap. 4,684,495, Cl. 376-352.000.

Wilson, John F.; and Barry, Robert F., to Westinghouse Electric Corp. Debris trap for a pressurized water nuclear reactor. 4,684,496, Cl. 376-352.000.

Wilson, John F.; and Gjertsen, Robert K., to Westinghouse Electric Corp. Top nozzle alignment sleeve capture arrangement in a reconstitutable fuel assembly. 4,684,502, Cl. 376-446.000.

Wilson, John F.; Gjertsen, Robert K.; and Ferrari, Harry M., to Westinghouse Electric Corp. Bow resistant structural member for fuel assemblies in non-control rod locations of a nuclear reactor core. 4,684,504, Cl. 376-447.000.

Wilson, John F.: *See*—
Gjertsen, Robert K.; and Wilson, John F., 4,684,499, Cl. 376-446.000.
Gjertsen, Robert K.; Shallenberger, John M.; and Wilson, John F., 4,684,500, Cl. 376-446.000.

Wilson, Ralph A. Powered movable storage enclosure. 4,683,902, Cl. 135-105.000.

Wilson, Syd R.: *See*—
Varker, Charles J.; Wilson, Syd R.; and Burnham, Marie E., 4,683,637, Cl. 437-63.000.

Wilwerding, Dennis J., to Honeywell Inc. Performance improvement for camera autofocus. 4,684,798, Cl. 250-201.000.

Wine, Charles M., to RCA Corporation. Multichannel computer generated sound synthesis system. 4,685,134, Cl. 381-17.000.

Winkler, Hans-Henning; and Rutschle, Eugen, to Chiron-Werke GmbH. Machine tool. 4,683,638, Cl. 29-568.000.

Winzer, Frederick W., to Emhart Industries, Inc. Rack aligning fixture and method of its use. 4,684,390, Cl. 65-133.000.

Wise, James H.: *See*—
Feher, Michael S.; Weidler, Charles H.; and Wise, James H., 4,684,191, Cl. 439-246.000.

Wittbrodt, Donald R., to United States of America, Army. Line charge detonation interlock assembly. 4,683,797, Cl. 89-1.130.

Wittich, Kurt, to Mannesmann Rexroth GmbH. Reservoir loading valve with pressure protection of the reservoir circuit. 4,683,909, Cl. 137-505.110.

Wittmann, Otto: *See*—
Kraus, Friedrich; Matthias, Guenther; Wittmann, Otto; and Diem, Hans, 4,684,690, Cl. 524-419.000.

Wittmuss, Howard D.: *See*—
Solie, John B.; Wittmuss, Howard D.; and Burnside, Orvin C., 4,683,826, Cl. 111-7.000.

Wohld, Dietrich: *See*—
Weihrich, Georg; and Wohld, Dietrich, 4,685,063, Cl. 364-472.000.

Wojciechowski, Longine J., to Reinforced Earth Company, The. Retaining wall construction and method for erection. 4,684,287, Cl. 404-6.000.

Wojcinski, Allan S. Containerized shooting range. 4,683,688, Cl. 52-79.100.

Wolford, Russel E. Device for holding playing cards and the like. 4,684,132, Cl. 273-150.000.

Wood, John C.: *See*—
Cox, Allen R.; Lowe, Anthony C.; and Wood, John C., 4,684,219, Cl. 350-343.000.

Wood, Lawson A. Analog/digital converter using remainder signals. 4,684,924, Cl. 340-347.0AD.

Woodle, Boyd M.: *See*—
Granata, Samuel J., Jr.; and Woodle, Boyd M., 4,684,582, Cl. 429-39.000.

Wooster Brush Company, The: *See*—
Gargas, Eugene F., 4,684,334, Cl. 417-568.000.

Worns, John R.; Chase, James W.; and Capriotti, Bruce W., to Uniroyal Plastics Co., Inc. Compressible photopolymer printing plate. 4,684,600, Cl. 430-271.000.

Wreford-Howard, David: *See*—
Rast, Robert M.; and Wreford-Howard, David, 4,684,980, Cl. 358-86.000.

Wrest, Robert A.: *See*—
Hondzinski, Leonard J.; and Wrest, Robert A., 4,683,668, Cl. 34-229.000.

Wright, David L.: *See*—
Carlson, Lee R.; Hegedus, Denes A.; Jarrett, Steven M.; Miller, Michael F.; Riley, Martin E.; and Wright, David L., 4,685,109, Cl. 372-61.000.
DeBell, Gary W.; Wright, David L.; Ruddock, Kenneth A.; Petersen, Alan B.; Carlson, Lee R.; and von Gunten, Marc K., 4,685,110, Cl. 372-103.000.

Wright, David M., to Wright Line, Inc. Stationary storing and dispensing system. 4,684,027, Cl. 211-40.000.

Wright Line, Inc.: *See*—
Wright, David M., 4,684,027, Cl. 211-40.000.

Wright, Mark W., to Innovation Industries, Inc. Relative position monitoring apparatus. 4,683,990, Cl. 187-134.000.

Wright, William B.; and Flatman, Richard J., to Rolls-Royce plc. Blade tip clearance control. 4,683,716, Cl. 60-226.100.

Wright, William B., Jr.; and Tomcufcik, Andrew S., to American Cyanamid Company. 3-heteroalkyl-2,4-quinzaolinediones. 4,684,654, Cl. 514-259.000.

Wroczynski, Ronald J., to General Electric Company. Modified polyphenylene ether resins having improved foamability and methods of making the same. 4,684,669, Cl. 521-90.000.

Wu, Chung P.: *See*—
Pankove, Jacques I.; and Wu, Chung P., 4,684,964, Cl. 357-17.000.

Wu, Zei C. Combination plug. 4,684,914, Cl. 337-198.000.

Wuerthner, Hubert: *See*—
Leichtfried, Friedrich; Wuerthner, Hubert; and Himmetsberger, Alois, 4,684,146, Cl. 280-626.000.

Wullems, George J.: *See*—
Schilperoort, Robbert A.; Krens, Frans A.; and Wullems, George J., 4,684,611, Cl. 435-172.300.

Wunsch, Steffen; Zilly, Gunter; and Schneider, Helmut, to Robert Bosch GmbH. Chain saw with oil pump having a plunger piston. 4,683,659, Cl. 30-381.000.

Wuthrich, Hans-Rudolf, to Sprecher & Schuh AG. Vacuum switch. 4,684,771, Cl. 200-144.00B.

Wycheck, Thomas H.: *See*—
Rudy, William J., Jr.; and Wycheck, Thomas H., 4,684,187, Cl. 439-600.000.

Wyman, Ransome J. Deflation-proof pneumatic tire with elastomeric fillings. 4,683,929, Cl. 152-313.000.

Wynn Oil Company: *See*—
Vataru, Marcel; and Schenach, Thomas A., 4,684,373, Cl. 44-63.000.

Xerox Corporation: *See*—
Acquaviva, Thomas, 4,684,241, Cl. 355-14.0SH.
Buchar, Wayne A.; and Russell, James P., 4,684,237, Cl. 355-8.000.
Derleth, James L.; and Ciminelli, Michael A., 4,683,756, Cl. 73-747.000.
Miller, William G., 4,684,240, Cl. 355-14.00R.
Till, Henry R.; Warner, Fredrick A.; and Radulski, Charles A., 4,684,238, Cl. 355-10.000.

Yaeger, John R., to Raychem Corporation. Slider lifter. 4,684,913, Cl. 337-140.000.

Yagi, Isaburo: *See*—
Ohtsuga, Hisao; Morinaga, Akio; Sakaguchi, Yoichi; Hyodo, Masakatsu; and Yagi, Isaburo, 4,684,556, Cl. 428-36.000.

Yagi, Masaru, to Kitagawa Industries Co., Ltd. Fixation device for electronic display. 4,684,093, Cl. 248-201.000.

Yahagi, Mitsuhisa, to Bridgestone Corporation. Pneumatic tire tread with a central zone and lateral zones of different hardness. 4,683,928, Cl. 152-209.00R.

Yakushiji, Tuguharu: *See*—
Hanatani, Sakio; and Yakushiji, Tuguharu, 4,683,967, Cl. 177-144.000.

Yale University: *See*—
Sartoreiii, Alan C.; and Shyam, Krishnamurthy, 4,684,747, Cl. 564-081.000.

Yamada, Minoru: *See*—
Oshima, Junji; Yamada, Minoru; and Kajita, Yasuyuki, 4,684,695, Cl. 525-36.000.

Yamada, Mitsuhiko, to Dainippon Screen Mfg. Co. Ltd. Correction method of color-separated signals. 4,684,978, Cl. 358-75.000.

Yamada, Shuhei: *See*—
Shionozaki, Yoshio; Mukai, Hiroshi; Obikawa, Tsuyoshi; and Yamada, Shuhei, 4,684,220, Cl. 350-350.00R.

Yamada, Toshitaka: *See*—
Sato, Yoshihisa; Kinugawa, Masumi; Akiyama, Susumu; Yamada, Toshitaka; Mizuno, Tiaki; and Suzuki, Atsushi, 4,683,858, Cl. 123-486.000.

Yamaguchi, Keiki; Hoshino, Kazuya; and Iwaoka, Hideto, to Yokogawa Hokushin Electric Corporation; and Yokogawa Medical Systems, Limited. NMR apparatus compensated for primary field changes. 4,684,889, Cl. 324-308.000.

Yamaguchi, Yoshitaka: *See*—
Hayashi, Seiichi; Takei, Katsumori; and Yamaguchi, Yoshitaka, 4,684,563, Cl. 428-207.000.

Yamaha: *See*—
Laimbock, Franz, 4,683,855, Cl. 123-432.000.

Yamaha Motor Co., Ltd.: *See*—
Tanaka, Toshio, 4,684,144, Cl. 280-281.00R.

Yamakawa, Yoshisuke: *See*—
Tokuoka, Yasumichi; Yamakawa, Yoshisuke; and Watanabe, Akio, 4,684,546, Cl. 427-130.000.

Yamamoto, Fumio; Suzuki, Takayoshi; Ikari, Masahiro; Saito, Susumu; Ohmori, Akira; and Yasuhara, Takashi, to Kuraray Co., Ltd. Contact lens. 4,684,705, Cl. 526-246.000.

Yamamoto, Hiroshi, to Kabushiki Kaisha Kyoto Daiichi Kagaku. Method and apparatus for measuring body fluid constituents and storing and managing the test data and method of controlling and processing the test data. 4,685,059, Cl. 364-415.000.

Yamamoto, Masayuki: *See*—
Minematsu, Yoshihiko; Tanaka, Minoru; Yamamoto, Masayuki; and Sakamoto, Kenichiro, 4,684,313, Cl. 414-735.000.

Yamamoto, Suguru: *See*—
Tsumura, Akio; Yamamoto, Suguru; and Miyaake, Chiharu, 4,684,256, Cl. 356-367.000.

Yamamoto, Takeshi: *See*—
Aizawa, Masandou; Yamauchi, Shigekazu; Sekine, Hisao; and Yamamoto, Takeshi, 4,684,218, Cl. 350-339.00F.

Yamamura, Takashige: *See*—
Asari, Akira; Yamamura, Takashige; Hattori, Shigeo; and Ueno, Tsuneya, 4,683,630, Cl. 29-159.010.

Yamano, Fumiyuki; and Okajima, Atsushi, to Hitachi, Ltd. Method of translation between languages with information of original language incorporated with translated language text. 4,685,060, Cl. 364-419.000.

Yamaoka, Shigemitsu: *See*—
Nishi, Kazuhiko; Ishii, Takatoshi; Yamashita, Ryozo; Yamaoka, Shigemitsu; and Okumura, Takatoshi, 4,684,942, Cl. 340-703.000.

Yamashita, Hiromitsu: *See*—
Takano, Hajime; and Yamashita, Hiromitsu, 4,684,973, Cl. 357-68.000.

Yamashita, Kazuya: *See*—
Watanabe, Yoshimi; and Yamashita, Kazuya, 4,684,351, Cl. 440-89.000.

Yamashita, Keiichi: *See*—
Kawamura, Hideo; Yoshida, Yukio; and Yamashita, Keiichi, 4,684,341, Cl. 431-242.000.

Yamashita, Naoki: *See*—
Kitamura, Masatsugu; Wagatsuma, Kikuji; Watanabe, Tokumi; Yamashita, Naoki; and Yoshida, Hiroshi, 4,683,795, Cl. 84-1.260.

Yamashita, Nobuo; and Takahashi, Susumu, to Olympus Optical Co., Ltd. Field view direction changing optical system. 4,684,224, Cl. 350-445.000.

Yamashita, Ryozo: *See*—
Nishi, Kazuhiko; Ishii, Takatoshi; Yamashita, Ryozo; Yamaoka, Shigemitsu; and Okumura, Takatoshi, 4,684,942, Cl. 340-703.000.

Yamato Mishin Seizo Kabushiki Kaisha: *See*—
Matsumoto, Takeshi, 4,683,828, Cl. 112-294.000.

Yamauchi, Shigekazu: *See*—
Aizawa, Masandou; Yamauchi, Shigekazu; Sekine, Hisao; and Yamamoto, Takeshi, 4,684,218, Cl. 350-339.00F.

Yamauchi, Yasutaka: *See*—
Tamura, Hiroshi; Nishibori, Kazuyoshi; Yamauchi, Yasutaka; and Kato, Katsushi, 4,683,859, Cl. 123-491.000.

Yannich, Marie E.; and Katz, Howard G., to National Starch and Chemical Corporation. Compositions for dielectric sealing applications comprising terpolymer emulsions of ethylene, vinyl esters and n-methylol comonomers blended with PVC emulsions buffered at a pH greater than 7. 4,684,689, Cl. 524-371.000.

Yasuda, Hiroshi: *See*—
Sugishima, Kenji; and Yasuda, Hiroshi, 4,684,315, Cl. 414-749.000.

Yasufuku, Yoshitaka; Nara, Masaji; and Akutsu, Shigeru, to Konishiroku Photo Industry Co., Ltd. Magnetic recording medium. 4,684,572, Cl. 428-323.000.

Yasuhara, Takashi: *See*—
Yamamoto, Fumio; Suzuki, Takayoshi; Ikari, Masahiro; Saito, Susumu; Ohmori, Akira; and Yasuhara, Takashi, 4,684,705, Cl. 526-246.000.

Yasunaga, Seiji: *See*—
Murakami, Hidenobu; and Yasunaga, Seiji, 4,684,782, Cl. 219-121.0EA.

Yasuoka, Akimasa, to Honda Giken Kogyo Kabushiki Kaisha. Method for controlling air/fuel ratio. 4,683,857, Cl. 123-478.000.

Yawn, David H.: *See*—
Feldman, Louis W.; and Yawn, David H., 4,684,361, Cl. 494-41.000.

Yeack, David C.: *See*—
Westercamp, Kenneth L.; Kurecka, Donald J.; and Yeack, David C., 4,683,971, Cl. 180-79.100.

Yeh, James T.: *See*—
Donelon, John J.; Tomkiewicz, Yaffa; Wassick, Thomas A.; and Yeh, James T., 4,684,437, Cl. 156-643.000.
Yeh, Lun-Shu R.; Greeness, Morten; and Fuller, Robert J., to Allied Corporation. Lead-titanium, bipolar electrode in a lead-acid battery. 4,683,648, Cl. 29-623.500.
Yie, Gene G., to Electric Power Research Institute, Inc. High pressure fluid jet apparatus for cutting and removing pavement. 4,683,684, Cl. 51-429.000.
Yim, Nelson C., to SmithKline Beckman Corporation. Polypeptide intermediates. 4,684,716, Cl. 530-328.000.
Yim, Nelson C.: *See*—
Callahan, James F.; Huffman, William F.; Moore, Michael L.; and Yim, Nelson C., 4,684,621, Cl. 514-11.000.
Yoda, Makoto: *See*—
Inoue, Hiroshi; Miyazaki, Makoto; Isoi, Masaaki; and Yoda, Makoto, 4,684,578, Cl. 428-462.000.
Yokogawa Hokushin Electric Corporation: *See*—
Hirata, Terutaka; Azegami, Tadashi; Kimura, Atsushi; and Katayama, Megumi, 4,683,754, Cl. 73-708.000.
Inou, Kiyoharu; and Saito, Hitoshi, 4,685,039, Cl. 363-16.000.
Yamaguchi, Keiki; Hoshino, Kazuya; and Iwaoka, Hideto, 4,684,889, Cl. 324-308.000.
Yokogawa Medical Systems, Limited: *See*—
Yamaguchi, Keiki; Hoshino, Kazuya; and Iwaoka, Hideto, 4,684,889, Cl. 324-308.000.
Yokoyama, Fumitomo; Kuwayama, Yoshinari; Tatsuta, Mitsugu; and Kuramochi, Koujiro, to Aisin Warner Limited; and Toyota Jidosha Kabushiki Kaisha. Governor valve. 4,683,903, Cl. 137-56.000.
Yokoyama, Kazumasa: *See*—
Imagawa, Takashi; Yokoyama, Kazumasa; and Mizushima, Yutaka, 4,684,633, Cl. 514-78.000.
Yokoyama, Takeo, to Showa Electric Wire & Cable Co., Ltd. Solid ultrasonic delay line. 4,684,906, Cl. 333-143.000.
Yong-Min, Wang. Universal system of encoding chinese characters and its keyboard. 4,684,926, Cl. 340-365.00R.
Yoshida, Hiroshi: *See*—
Kitamura, Masatsugu; Wagatsuma, Kikuji; Watanabe, Tokumi; Yamashita, Naoki; and Yoshida, Hiroshi, 4,683,795, Cl. 84-1.260.
Yoshida Industry Co., Limited: *See*—
Watanabe, Nobuhisa; Iwamoto, Hisao; Nasuno, Toshihiro; and Sakamaki, Yoshio, 4,684,017, Cl. 206-235.000.
Yuhara, Yukitomo; and Shioi, Yuji, 4,683,899, Cl. 132-82.00R.
Yoshida, Masafumi: *See*—
Morita, Yukiji; and Yoshida, Masafumi, 4,685,075, Cl. 364-569.000.
Yoshida, Naoyuki: *See*—
Kitano, Kisei; Ogawa, Tetsuya; Furukawa, Yoshito; Yoshida, Naoyuki; Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; and Nigorikawa, Kazunori, 4,684,476, Cl. 252-299.610.
Sugimori, Shigeru; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Ogawa, Tetsuya; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,684,478, Cl. 252-299.630.
Yoshida, Paul S.: *See*—
Blomstedt, John W.; Yoshida, Paul S.; Irving, Wesley F.; and Roudenko, Vladimir, 4,685,032, Cl. 361-412.000.
Yoshida, Ryo: *See*—
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,684,397, Cl. 71-96.000.
Yoshida, Tadao, to Sony Corporation. Apparatus for reproducing data signal. 4,685,098, Cl. 369-59.000.
Yoshida, Yaoko, to Hitachi, Ltd. Vector processor for processing one vector instruction with a plurality of vector processing units. 4,685,076, Cl. 364-736.000.
Yoshida, Yukio: *See*—
Kawamura, Hideo; Yoshida, Yukio; and Yamashita, Keiichi, 4,684,341, Cl. 431-242.000.
Yoshioka, Sadashichi: *See*—
Matsuura, Masahiko; Doi, Nobuo; Yoshioka, Sadashichi; Okimoto, Haruo; and Ueda, Kazuhiko, 4,683,856, Cl. 123-436.000.
Yoshizawa, Nobuyuki: *See*—
Ishihara, Koushi; Murakami, Yasuji; Yoshizawa, Nobuyuki; and Funaki, Kiyoshi, 4,684,213, Cl. 350-96.230.
Younes, Usama E., to Atlantic Richfield Company. Flame-retardant molded composition which incorporates a poly(styrene-CO-N-phenylmaleimide-CO-dibromostyrene) copolymer. 4,684,692, Cl. 524-548.000.
Youngquist, Robert C.: *See*—
Shaw, Herbert J.; Youngquist, Robert C.; and Brooks, Janet L., 4,684,215, Cl. 350-96.290.
Yuhara, Yukitomo; and Shioi, Yuji, to Yoshida Industry Co., Ltd. Vanity case. 4,683,899, Cl. 132-82.00R.
Zabrovsky, Stanislav G.: *See*—
Baraban, Viktor P.; Zabrovsky, Stanislav G.; Zvyagin, Albert F.; Lazarev, Grigory B.; and Tars, Yaak A., 4,685,045, Cl. 363-68.000.
Zago, Giovanni; and Prataviera, Giovanni. Cleaner cartridge, in particular for cleaning audio and video tape recorders and players. 4,685,015, Cl. 360-128.000.
Zaker, Ronald C.: *See*—
Akiyama, Steven R.; Zaker, Ronald C.; and Shoup, Curtis C., 4,685,037, Cl. 362-276.000.
Zave, Derek A., to American Telephone and Telegraph Company; and Bell Telephone Laboratories, Incorporated. Computer system with tasking. 4,685,125, Cl. 379-96.000.
Zechnall, Martin: *See*—
Breitkreuz, Helmut; Clement, Albrecht; Mayer, Dieter; Ruppmann, Claus; Walz, Dieter; Wild, Ernst; and Zechnall, Martin, 4,683,861, Cl. 123-520.000.
Zeeh, Bernd: *See*—
Rentzea, Costin; Sauter, Hubert; Zeeh, Bernd; Heilen, Gerd; and Jung, Johann, 4,684,392, Cl. 71-76.000.
Zega, Bogdan, to Battelle Development Corporation. Hard layer formed by incorporating nitrogen into Mo or W metal and method for obtaining this layer. 4,684,536, Cl. 427-47.000.
Zgorzelski, Wolfgang: *See*—
Kessen, Gunther; Cornils, Boy; Gick, Wilhelm; Wiebus, Ernst; Hibbel, Joseph; Bach, Hanswilhelm; and Zgorzelski, Wolfgang, 4,684,750, Cl. 568-883.000.
Zibis, Peter, to Siemens Aktiengesellschaft. Electrical filter with acoustic waves. 4,684,907, Cl. 333-196.000.
Ziegler, Hermann, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Holding arrangement for a pane such as a windshield. 4,683,694, Cl. 52-208.000.
Ziegler, Thomas K.: *See*—
Cornellier, Vincent; and Ziegler, Thomas K., 4,683,891, Cl. 128-630.000.
Ziesse, Norman G.: *See*—
Bowman, Wayne C.; Magalhaes, Frank M.; Suiter, Weyman B.; and Ziesse, Norman G., 4,685,041, Cl. 363-40.000.
Zilly, Gunter: *See*—
Wunsch, Steffen; Zilly, Gunter; and Schneider, Helmut, 4,683,659, Cl. 30-381.000.
Zimmer, Mark D., to Halliburton Company. Simultaneous digitizing apparatus for an acoustic tool. 4,684,947, Cl. 340-858.000.
Zofan, Ely S.; and Thurston, Marlin O., to Floyd Bell Associates, Inc. Annunciator circuit for elevator systems. 4,684,927, Cl. 340-384.00E.
Zuffante, Charles R.: *See*—
Haskins, Timothy B.; Goebel, Franz; Batson, David C.; and Zuffante, Charles R., 4,684,586, Cl. 429-115.000.
Zvyagin, Albert F.: *See*—
Baraban, Viktor P.; Zabrovsky, Stanislav G.; Zvyagin, Albert F.; Lazarev, Grigory B.; and Tars, Yaak A., 4,685,045, Cl. 363-68.000.
Zygo Corporation: *See*—
Sommargren, Gary E., 4,684,828, Cl. 307-425.000.
38Havel, Karel. Electrical zero insertion force multiconnector. 4,684,193, Cl. 439-259.000.
501 Keene Corp.: *See*—
Demont, Allan S., 4,683,791, Cl. 83-874.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF AUGUST, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Baker Protective Services, Inc.: *See*—
Le Nay, Tom W.; Hadden, Donald L.; and Beckwith, George S., Re. 32,468, Cl. 340-506.000.

Beckwith, George S.: *See*—
Le Nay, Tom W.; Hadden, Donald L.; and Beckwith, George S., Re. 32,468, Cl. 340-506.000.

Hadden, Donald L.: *See*—
Le Nay, Tom W.; Hadden, Donald L.; and Beckwith, George S., Re. 32,468, Cl. 340-506.000.

Le Nay, Tom W.; Hadden, Donald L.; and Beckwith, George S., to Baker Protective Services, Inc. Central station alarm. Re. 32,468, Cl. 340-506.000.

Mays, James A. Plow attachment for converting a rotary tiller into a plow. Re. 32,467, Cl. 172-253.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Belavitch, Alphonse L.: *See*—
Norton, Edward J.; Oparowski, Paul; and Belavitch, Alphonse L., B1 4,451,996, Cl. 36-129.000.

Evans, Pat: *See*—
Kung, Shiu H., B1 4,226,728, Cl. 252-8.000.

Fuji Photo Film Co., Ltd.: *See*—
Kiritani, Masataka, B1 3,900,669, Cl. 346-215.000.

Kiritani, Masataka, to Fuji Photo Film Co., Ltd. Pressure-sensitive recording sheet with microcapsules having polyurea walls. B1 3,900,669, 8-4-87, Cl. 346-215.000.

Kroy Inc.: *See*—
Luartes, Cleto R.; and Powell, William H., Jr., B1 4,462,708, Cl. 400-304.000.

Kung, Shiu H., to Evans, Pat. Fire extinguisher and fire extinguishing composition. B1 4,226,728, 8-4-87, Cl. 252-8.000.

Luartes, Cleto R.; and Powell, William H., Jr., to Kroy Inc. Automated tape lettering machine. B1 4,462,708, 8-4-87, Cl. 400-304.000.

New Balance Athletic Shoe, Inc.: *See*—
Norton, Edward J.; Oparowski, Paul; and Belavitch, Alphonse L., B1 4,451,996, Cl. 36-129.000.

Norton, Edward J.; Oparowski, Paul; and Belavitch, Alphonse L., to New Balance Athletic Shoe, Inc. Athletic shoe with collar. B1 4,451,996, 8-4-87, Cl. 36-129.000.

Oparowski, Paul: *See*—
Norton, Edward J.; Oparowski, Paul; and Belavitch, Alphonse L., B1 4,451,996, Cl. 36-129.000.

Powell, William H., Jr.: *See*—
Luartes, Cleto R.; and Powell, William H., Jr., B1 4,462,708, Cl. 400-304.000.

St. Clair, David J., to Shell Oil Company. Asymmetric block copolymers and corresponding adhesive formulations. B1 4,391,949, 8-4-87, Cl. 525-99.000.

Shell Oil Company: *See*—
St. Clair, David J., B1 4,391,949, Cl. 525-99.000.

Shjeflo, Jelmer B. Decoy. B1 4,062,141, 8-4-87, Cl. 43-3.000.

LIST OF DESIGN PATENTEES

A/S More Tekstilfabrikk: *See*—
Gjendemsjo, Peder, 291,140, Cl. D2-267.000.

Allen, Leslie. Footware ornament. 291,145, 8-4-87, Cl. D2-317.000.

Allibert SA: *See*—
Hubert, Manfred, 291,161, Cl. D6-370.000.

American Standard Inc.: *See*—
Bergmann, Konrad; and Fabian, Wolfgang, 291,234, Cl. D23-23.000.
Bergmann, Konrad; and Fabian, Wolfgang, 291,235, Cl. D23-23.000.

Arata, Winfield H., Jr. Air vehicle. 291,215, 8-4-87, Cl. D21-87.000.

Averna, Anna Maria, Francesco Maria Claudio Averna, heirs: *See*—
Averna, Michele, deceased, 291,180, Cl. D9-405.000.

Averna, Michele, deceased (by Averna, Anna Maria, Francesco Maria Claudio Averna, heirs), to Fratelli Averna S.P.A. Bottle. 291,180, 8-4-87, Cl. D9-405.000.

Avnet, Inc.: *See*—
Stagl, Peter M., 291,250, Cl. D25-75.000.
Stagl, Peter M., 291,251, Cl. D25-75.000.

Baril, Conrad J. Holder for paint can. 291,184, 8-4-87, Cl. D9-455.000.

Baxter Travenol Laboratories, Inc.: *See*—
Sugarbaker, Paul H.; and Hancock, John C., 291,248, Cl. D24-33.000.

Bay, Bengt A., to Bay & Vissing A/S. Roller cover support for a painting roller. 291,152, 8-4-87, Cl. D4-122.000.

Bay & Vissing A/S: *See*—
Bay, Bengt A., 291,152, Cl. D4-122.000.

BC Creations, Inc.: *See*—
Beran, Mark A., 291,150, Cl. D3-48.000.

Beavers, Allan E., to T.A. Pelsue Company. Combined ventilating and purging blower. 291,243, 8-4-87, Cl. D23-162.000.

Bellini, Mario, to Nippon Gakki Seizo Kabushiki Kaisha. Headphone. 291,198, 8-4-87, Cl. D14-36.000.

Benson, James A.: *See*—
Jones, Paul W.; and Benson, James A., 291,244, Cl. D24-17.000.

Beran, Mark A., to BC Creations, Inc. Foldable travel bag. 291,150, 8-4-87, Cl. D3-48.000.

Bergmann, Konrad; and Fabian, Wolfgang, to American Standard Inc. Faucet or similar article. 291,234, 8-4-87, Cl. D23-23.000.

Bergmann, Konrad; and Fabian, Wolfgang, to American Standard Inc. Faucet or similar article. 291,235, 8-4-87, Cl. D23-23.000.

Binden, John A., to Northrop Corporation. Aircraft. 291,194, 8-4-87, Cl. D12-327.000.

Biscoe, Thomas S., to Litton Business Systems, Inc. Chair. 291,160, 8-4-87, Cl. D6-366.000.

Bishop, Robert M.; and Ditton, Louis G., to Essex Group, Inc. Container insert. 291,172, 8-4-87, Cl. D7-387.000.

Blue Point of Italy: *See*—
Pelosi, Giancarlo, 291,182, Cl. D9-433.000.

Boardman, Robert K.: *See*—
Luyk, Harley E.; Boardman, Robert K.; Dahlgren, Jean E.; and Voigt, Christine J., 291,164, Cl. D6-465.000.

Bokmiller, David J.: *See*—
Heck, Samuel C.; and Bokmiller, David J., 291,259, Cl. D32-45.000.

Castelli S.p.A.: *See*—
Monesi, Mauro, 291,159, Cl. D6-366.000.

Chang, Youn H.; and Kim, Soo D., to Samsung Electron Devices Co., Ltd. Computer monitor. 291,202, 8-4-87, Cl. D14-113.000.

Combi Co., Ltd.: *See*—
Nakao, Shinroku; Ishii, Yoshiyasu; and Matsumoto, Susumu, 291,156, Cl. D6-338.000.

Nakao, Shinroku; Ishii, Yoshiyasu; and Hanashima, Taira, 291,214, Cl. D21-76.000.
Commonwealth of Australia, The: *See—*
Toms, Maxwell H., 291,178, Cl. D9-345.000.
Cranford, Michael D., to Ocean Gem, Inc. Collapsible plastic holder for a container or the like. 291,168, 8-4-87, Cl. D7-70.000.
Cunard, Joel C.: *See—*
Smith, Stephen W.; and Cunard, Joel C., 291,187, Cl. D12-111.000.
Cunningham, Roy R. Clock casing. 291,186, 8-4-87, Cl. D10-128.000.
Dahlgren, Jean E.: *See—*
Luyk, Harley E.; Boardman, Robert K.; Dahlgren, Jean E.; and Voigt, Christine J., 291,164, Cl. D6-465.000.
Dair, Thomas: *See—*
Stowell, Davin; Viemeister, Tucker; and Dair, Thomas, 291,173, Cl. D8-36.000.
Datta, Bishnu P., to L-TEC Company. Pressure regulator. 291,231, 8-4-87, Cl. D23-21.000.
Davis, Robert C. B., to Rubery Owen-Rockwell Limited. Suspension unit for wheels of a vehicle. 291,190, 8-4-87, Cl. D12-160.000.
Dek, Inc.: *See—*
Santucci, Donald; and Denemark, Phillip W., 291,177, Cl. D8-395.000.
Delepine, Jean-Claude. Faucet set. 291,236, 8-4-87, Cl. D23-25.000.
Delepine, Jean-Claude. Faucet handle. 291,237, 8-4-87, Cl. D23-28.000.
Denemark, Phillip W.: *See—*
Santucci, Donald; and Denemark, Phillip W., 291,177, Cl. D8-395.000.
Detroit Bracket Company, Inc.: *See—*
Sokol, Steven, 291,176, Cl. D8-380.000.
Ditton, Louis G.: *See—*
Bishop, Robert M.; and Ditton, Louis G., 291,172, Cl. D7-387.000.
Drag Specialties, Inc.: *See—*
Stahel, Alwin J., 291,188, Cl. D12-126.000.
Stahel, Alwin J., 291,189, Cl. D12-126.000.
Dugan, Daniel. Hunter's harness. 291,151, 8-4-87, Cl. D3-100.000.
Eastman Kodak Company: *See—*
Lavine, Monte D., 291,205, Cl. D16-14.000.
Embry, Janie P. Doll. 291,221, 8-4-87, Cl. D21-159.000.
Envall, Bjorn E. A.; and Ohlsson, Dick O., to Saab-Scania Aktiebolag. Lower inner part of a door panel of an automobile. 291,191, 8-4-87, Cl. D12-190.000.
Envall, Bjorn E. A.; and Ohlsson, Dick O., to Saab-Scania Aktiebolag. Rear part of a sill beam to an automobile. 291,192, 8-4-87, Cl. D12-190.000.
Essex Group, Inc.: *See—*
Bishop, Robert M.; and Ditton, Louis G., 291,172, Cl. D7-387.000.
Evans, Clyde R. Combined fisherman's lamp and clipper. 291,227, 8-4-87, Cl. D22-149.000.
Fabian, Wolfgang: *See—*
Bergmann, Konrad; and Fabian, Wolfgang, 291,234, Cl. D23-23.000.
Bergmann, Konrad; and Fabian, Wolfgang, 291,235, Cl. D23-23.000.
Fee Tat Plastic Factory Limited: *See—*
Wan, Albert, 291,226, Cl. D22-123.000.
Forbicini, Fulvio. Seat. 291,167, 8-4-87, Cl. D6-381.000.
Foulds, Howard. Tongs. 291,169, 8-4-87, Cl. D7-105.000.
Franco, Richard E. Combined shipping container and cocktail preparation package. 291,181, 8-4-87, Cl. D9-428.000.
Fratelli Averna S.P.A.: *See—*
Averna, Michele, deceased, 291,180, Cl. D9-405.000.
Frizon, Maud. Perfume bottle. 291,179, 8-4-87, Cl. D9-371.000.
Georg Fischer Aktiengesellschaft: *See—*
Kunz, Peter, 291,229, Cl. D23-19.000.
Georg Fischer Atkiengesellschaft: *See—*
Kunz, Peter, 291,230, Cl. D23-19.000.
Gjendemsjo, Peder, to A/S More Tekstilfabrikk. Legging upper and sole periphery therefor. 291,140, 8-4-87, Cl. D2-267.000.
Greer, Richard E., Sr., to Swiss-Tex, Incorporated. Household sponge. 291,258, 8-4-87, Cl. D32-40.000.
Hamilton Sorter Co., Inc.: *See—*
Kwiecinski, Alfred, 291,162, Cl. D6-430.000.
Kwiecinski, Alfred, 291,163, Cl. D6-430.000.
Hampshire, James F.; and Hawkins, Larry S., to Rubbermaid Commercial Products. Adjustable CRT supporting stand. 291,204, 8-4-87, Cl. D14-114.000.
Hanashima, Taira: *See—*
Nakao, Shinroku; Ishii, Yoshiyasu; and Hanashima, Taira, 291,214, Cl. D21-76.000.
Hancock, John C.: *See—*
Sugarbaker, Paul H.; and Hancock, John C., 291,248, Cl. D24-33.000.
Hanek, Robert D. Nestable portable boat. 291,193, 8-4-87, Cl. D12-300.000.
Hans Grohe GmbH & Co. KG: *See—*
Haug, Andreas; and Schonherr, Thomas, 291,232, Cl. D23-23.000.
Haug, Andreas; and Schonherr, Thomas, 291,238, Cl. D23-29.000.
Haug, Andreas; and Schonherr, Thomas, 291,239, Cl. D23-31.000.
Harden, Theodore A.; and Scott, Richard E., to Takasago USA, Inc.; and Piezo Electric Products, Inc. Refill for a fragrance dispenser. 291,242, 8-4-87, Cl. D23-150.000.
Hasegawa, Shigeru: *See—*
Ito, Masafumi; Suzuki, Koji; Hasegawa, Shigeru; and Takita, Haruki, 291,196, Cl. D14-5.000.
Haug, Andreas; and Schonherr, Thomas, to Hans Grohe GmbH & Co. KG. Faucet. 291,232, 8-4-87, Cl. D23-23.000.
Haug, Andreas; and Schonherr, Thomas, to Hans Grohe GmbH & Co. KG. Faucet handle. 291,238, 8-4-87, Cl. D23-29.000.
Haug, Andreas; and Schonherr, Thomas, to Hans Grohe GmbH & Co. KG. Combined escutcheon, water valve and diverter valve for bathtub shower units. 291,239, 8-4-87, Cl. D23-31.000.
Hawkins, Larry S.: *See—*
Hampshire, James F.; and Hawkins, Larry S., 291,204, Cl. D14-114.000.
Heck, Samuel C.; and Bokmiller, David J., to Sani-Fresh International, Inc. Fluid cartridge for a cleaning tool or the like. 291,259, 8-4-87, Cl. D32-45.000.
Hedstrom Corporation: *See—*
Smith, Stephen W.; and Cunard, Joel C., 291,187, Cl. D12-111.000.
Hollander, James. Face shield. 291,256, 8-4-87, Cl. D29-16.000.
Hubert, Manfred, to Allibert SA. Stackable armchair. 291,161, 8-4-87, Cl. D6-370.000.
Hyman, Andrew J. Eye glasses or similar article. 291,206, 8-4-87, Cl. D16-111.000.
Ichikawa, Matsuo, to Ichikawa Press Industry Co., Ltd. Fog light. 291,252, 8-4-87, Cl. D26-29.000.
Ichikawa Press Industry Co., Ltd.: *See—*
Ichikawa, Matsuo, 291,252, Cl. D26-29.000.
Interlego A.G.: *See—*
Ryaa, Jan; and Poulsen, Ole V., 291,219, Cl. D21-123.000.
Tapdrup, Erik P., 291,217, Cl. D21-108.000.
International Business Machines Corp.: *See—*
Tsuruta, Takeshi; Yoshitani, Takuo; Kanoh, Shosaku; Kamiya, Eiichi; and Tamaki, Yasuyuki, 291,254, Cl. D14-113.000.
Ishii, Yoshiyasu: *See—*
Nakao, Shinroku; Ishii, Yoshiyasu; and Matsumoto, Susumu, 291,156, Cl. D6-338.000.
Nakao, Shinroku; Ishii, Yoshiyasu; and Hanashima, Taira, 291,214, Cl. D21-76.000.
Ito, Masafumi; Suzuki, Koji; Hasegawa, Shigeru; and Takita, Haruki, to Teac Corporation. Combined tape recorder and audio mixer. 291,196, 8-4-87, Cl. D14-5.000.
Jado Bathroom and Hardware Manufacturing, Inc.: *See—*
Jans, Franz W., 291,233, Cl. D23-25.000.
Jans, Franz W., to Jado Bathroom and Hardware Manufacturing, Inc. Faucet set. 291,233, 8-4-87, Cl. D23-25.000.
John Manufacturing Limited: *See—*
Yuen, John S., 291,223, Cl. D22-123.000.
Yuen, John S., 291,224, Cl. D22-123.000.
Yuen, John S., 291,225, Cl. D22-123.000.
Jones, Paul W.; and Benson, James A., to Physio-Control Corporation. Electrocardiogram monitor for physiological condition. 291,244, 8-4-87, Cl. D24-17.000.
Kamiya, Eiichi: *See—*
Tsuruta, Takeshi; Yoshitani, Takuo; Kanoh, Shosaku; Kamiya, Eiichi; and Tamaki, Yasuyuki, 291,254, Cl. D14-113.000.
Kanoh, Shosaku: *See—*
Tsuruta, Takeshi; Yoshitani, Takuo; Kanoh, Shosaku; Kamiya, Eiichi; and Tamaki, Yasuyuki, 291,254, Cl. D14-113.000.
Kelley, Brenda, to Pensa, Inc. Shoe upper. 291,142, 8-4-87, Cl. D2-314.000.
Kelley, Brenda; and Tong, James K., to Pensa, Inc. Shoe sole. 291,147, 8-4-87, Cl. D2-320.000.
Kelley, Brenda: *See—*
Selbiger, Lawrence; and Kelley, Brenda, 291,143, Cl. D2-314.000.
Tong, James K.; and Kelley, Brenda, 291,141, Cl. D2-314.000.
Kim, Soo D.: *See—*
Chang, Youn H.; and Kim, Soo D., 291,202, Cl. D14-113.000.
Kiraly, Benedikt. Tennis racket. 291,222, 8-4-87, Cl. D21-212.000.
Knight, Jeffrey E.: *See—*
Morris, Reny G., 291,166, Cl. D6-476.000.
Koziol, Stephan. Corkscrew. 291,174, 8-4-87, Cl. D8-38.000.
Krueger, Clyde A.; Krueger, Katharine C.; Preus, Herman A.; and Nelson, Bruce D. Fishhook extractor. 291,228, 8-4-87, Cl. D22-149.000.
Krueger, Katharine C.: *See—*
Krueger, Clyde A.; Krueger, Katharine C.; Preus, Herman A.; and Nelson, Bruce D., 291,228, Cl. D22-149.000.
Kunz, Kendall C. Contact lens inserter. 291,207, 8-4-87, Cl. D16-124.000.
Kunz, Peter, to Georg Fischer Aktiengesellschaft. Valve. 291,229, 8-4-87, Cl. D23-19.000.
Kunz, Peter, to Georg Fischer Atkiengesellschaft. Valve. 291,230, 8-4-87, Cl. D23-19.000.
Kwiecinski, Alfred, to Hamilton Sorter Co., Inc. Personal computer storage cabinet. 291,162, 8-4-87, Cl. D6-430.000.
Kwiecinski, Alfred, to Hamilton Sorter Co., Inc. Storage cabinet for a personal computer. 291,163, 8-4-87, Cl. D6-430.000.
L-TEC Company: *See—*
Datta, Bishnu P., 291,231, Cl. D23-21.000.
Labbe, Benoit: *See—*
Labbe, Pierre; and Labbe, Benoit, 291,210, Cl. D20-43.000.
Labbe, Pierre; and Labbe, Benoit. Panel for receiving advertising material. 291,210, 8-4-87, Cl. D20-43.000.
LaLanne, Claude. Headset or similar article. 291,197, 8-4-87, Cl. D14-36.000.
Lanci, Dennis M.; and Paull, Mike M., to Physio-Control Corporation. Defibrillator. 291,245, 8-4-87, Cl. D24-17.000.
Lavine, Monte D., to Eastman Kodak Company. Microfilm retrieval terminal or the like. 291,205, 8-4-87, Cl. D16-14.000.
Levine, Susan H., to Pottery by Levine, Inc. Oil lamp wick holder. 291,255, 8-4-87, Cl. D26-116.000.

Litton Business Systems, Inc.: *See*—
Biscoe, Thomas S., 291,160, Cl. D6-366.000.
Lower, Jerry L., to Zimmer, Inc. Drill guide instrument for surgical use or the like. 291,246, 8-4-87, Cl. D24-26.000.
Luyk, Harley E.; Boardman, Robert K.; Dahlgren, Jean E.; and Voigt, Christine J., to Worden Company, The. Storage rack for books, tapes, records and the like. 291,164, 8-4-87, Cl. D6-465.000.
MacGregor, Bruce: *See*—
Tong, James K.; and MacGregor, Bruce, 291,144, Cl. D2-314.000.
Man, Na C. Scooter. 291,211, 8-4-87, Cl. D21-80.000.
Manderfield, Ellen B., to Oneida Ltd. Spoon or similar article. 291,170, 8-4-87, Cl. D7-143.000.
Manning, John M., to Vinyl Improvement Products Company. Building siding panel. 291,249, 8-4-87, Cl. D25-73.000.
Mariol, James F. Toy workbench. 291,218, 8-4-87, Cl. D21-121.000.
Mariol, James F. Toy waterway. 291,220, 8-4-87, Cl. D21-143.000.
Martin, Leo. Chair frame. 291,157, 8-4-87, Cl. D6-373.000.
Matsumoto, Susumu: *See*—
Nakao, Shinroku; Ishii, Yoshiyasu; and Matsumoto, Susumu, 291,156, Cl. D6-338.000.
Messenger, John D., to Metal Box p.l.c. Lid for a container. 291,183, 8-4-87, Cl. D9-454.000.
Metal Box p.l.c.: *See*—
Messenger, John D., 291,183, Cl. D9-454.000.
Miller, Lewie H., Jr.: *See*—
Weisel, Charles W., Jr.; and Miller, Lewie H., Jr., 291,201, Cl. D14-100.000.
Monesi, Mauro, to Castelli S.p.A. Chair. 291,159, 8-4-87, Cl. D6-366.000.
Morris, Reny G., to Knight, Jeffrey E., a part interest. Display rack. 291,166, 8-4-87, Cl. D6-476.000.
Motts, Brian C. Airship. 291,216, 8-4-87, Cl. D21-90.000.
Nakao, Shinroku; Ishii, Yoshiyasu; and Matsumoto, Susumu, to Combi Co., Ltd. Convertible high chair. 291,156, 8-4-87, Cl. D6-338.000.
Nakao, Shinroku; Ishii, Yoshiyasu; and Hanashima, Taira, to Combi Co., Ltd. Toy vehicle. 291,214, 8-4-87, Cl. D21-76.000.
Nakatani, Koma, to Velbon International Corporation. Collapsible easel. 291,153, 8-4-87, Cl. D6-312.000.
Nava Milano S.p.A.: *See*—
Nava, Rinaldo, 291,209, Cl. D19-26.000.
Nava, Rinaldo, to Nava Milano S.p.A. Combined notebook, calculator and casing therefor. 291,209, 8-4-87, Cl. D19-26.000.
Nelson, Bruce D.: *See*—
Krueger, Clyde A.; Krueger, Katharine C.; Preus, Herman A.; and Nelson, Bruce D., 291,228, Cl. D22-149.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Bellini, Mario, 291,198, Cl. D14-36.000.
Northrop Corporation: *See*—
Binden, John A., 291,194, Cl. D12-327.000.
Ocean Gem, Inc.: *See*—
Cranford, Michael D., 291,168, Cl. D7-70.000.
Ohlsson, Dick O.: *See*—
Envall, Bjorn E. A.; and Ohlsson, Dick O., 291,191, Cl. D12-190.000.
Envall, Bjorn E. A.; and Ohlsson, Dick O., 291,192, Cl. D12-190.000.
Oki America, Inc.: *See*—
Watanabe, Katsuhito, 291,199, Cl. D14-64.000.
Oneida Ltd.: *See*—
Manderfield, Ellen B., 291,170, Cl. D7-143.000.
Ortega, Charles J., to Xantech Corporation. Interior panel lighting fixture for vehicle or the like. 291,253, 8-4-87, Cl. D26-29.000.
Owen, Patricia J. Cap rack. 291,154, 8-4-87, Cl. D6-323.000.
Paull, Mike M.: *See*—
Lanci, Dennis M.; and Paull, Mike M., 291,245, Cl. D24-17.000.
Pelosi, Giancarlo, to Blue Point of Italy. Container blank. 291,182, 8-4-87, Cl. D9-433.000.
Pensa, Inc.: *See*—
Kelley, Brenda, 291,142, Cl. D2-314.000.
Kelley, Brenda; and Tong, James K., 291,147, Cl. D2-320.000.
Selbiger, Lawrence; and Kelley, Brenda, 291,143, Cl. D2-314.000.
Selbiger, Lawrence, 291,146, Cl. D2-320.000.
Tong, James K.; and Kelley, Brenda, 291,141, Cl. D2-314.000.
Tong, James K.; and MacGregor, Bruce, 291,144, Cl. D2-314.000.
Physio-Control Corporation: *See*—
Jones, Paul W.; and Benson, James A., 291,244, Cl. D24-17.000.
Lanci, Dennis M.; and Paull, Mike M., 291,245, Cl. D24-17.000.
Piezo Electric Products, Inc.: *See*—
Harden, Theodore A.; and Scott, Richard E., 291,242, Cl. D23-150.000.
Pottery by Levine, Inc.: *See*—
Levine, Susan H., 291,255, Cl. D26-116.000.
Poulsen, Ole V.: *See*—
Ryaa, Jan; and Poulsen, Ole V., 291,219, Cl. D21-123.000.
Preus, Herman A.: *See*—
Krueger, Clyde A.; Krueger, Katharine C.; Preus, Herman A.; and Nelson, Bruce D., 291,228, Cl. D22-149.000.
Rademacher, Manfred. Spout body. 291,240, 8-4-87, Cl. D23-32.000.
Rademacher, Manfred. Spout. 291,241, 8-4-87, Cl. D23-32.000.
Ray, Leroy, to Storage Unlimited, Inc. Shelf unit. 291,165, 8-4-87, Cl. D6-465.000.
Rich, Beverly C. Two-way binder rack. 291,158, 8-4-87, Cl. D6-362.000.
Rizzo, Marco. Knee platform crutch. 291,148, 8-4-87, Cl. D3-7.000.
Rogers, Gerald H. Hinge strap. 291,175, 8-4-87, Cl. D8-327.000.
Rubbermaid Commercial Products: *See*—
Hampshire, James F.; and Hawkins, Larry S., 291,204, Cl. D14-114.000.
Rubery Owen-Rockwell Limited: *See*—
Davis, Robert C. B., 291,190, Cl. D12-160.000.
Ryaa, Jan; and Poulsen, Ole V., to Interlego A.G. Toy seat or similar article. 291,219, 8-4-87, Cl. D21-123.000.
Saab-Scania Aktiebolag: *See*—
Envall, Bjorn E. A.; and Ohlsson, Dick O., 291,191, Cl. D12-190.000.
Envall, Bjorn E. A.; and Ohlsson, Dick O., 291,192, Cl. D12-190.000.
Samsung Electron Devices Co., Ltd.: *See*—
Chang, Youn H.; and Kim, Soo D., 291,202, Cl. D14-113.000.
Sani-Fresh International, Inc.: *See*—
Heck, Samuel C.; and Bokmiller, David J., 291,259, Cl. D32-45.000.
Santucci, Donald; and Denemark, Phillip W., to Dek, Inc. Flat wire clip. 291,177, 8-4-87, Cl. D8-395.000.
Sanyei Corporation: *See*—
Stowell, Davin; Viemeister, Tucker; and Dair, Thomas, 291,173, Cl. D8-36.000.
Schonherr, Thomas: *See*—
Haug, Andreas; and Schonherr, Thomas, 291,232, Cl. D23-23.000.
Haug, Andreas; and Schonherr, Thomas, 291,238, Cl. D23-29.000.
Haug, Andreas; and Schonherr, Thomas, 291,239, Cl. D23-31.000.
Scott, Richard E.: *See*—
Harden, Theodore A.; and Scott, Richard E., 291,242, Cl. D23-150.000.
Selbiger, Lawrence; and Kelley, Brenda, to Pensa, Inc. Shoe upper. 291,143, 8-4-87, Cl. D2-314.000.
Selbiger, Lawrence, to Pensa, Inc. Shoe sole. 291,146, 8-4-87, Cl. D2-320.000.
Shea, James P. Portable speech synthesizer for speech impaired individuals. 291,195, 8-4-87, Cl. D14-1.000.
Silver, Gary S. Cover for computer mouse. 291,203, 8-4-87, Cl. D14-114.000.
Silver Seiko Limited: *See*—
Tamada, Kenji; Yamakawa; and Takahashi, Kazuaki, 291,208, Cl. D18-12.000.
Simons, Ronald. Game board. 291,212, 8-4-87, Cl. D21-25.000.
Smith, J. Rudy. Emergency bag. 291,149, 8-4-87, Cl. D3-48.000.
Smith, Stephen W.; and Cunard, Joel C., to Hedstrom Corporation. Bicycle. 291,187, 8-4-87, Cl. D12-111.000.
Snyder Laboratories, Inc.: *See*—
Weilbacher, Eugene E., 291,247, Cl. D24-27.000.
Sokol, Steven, to Detroit Bracket Company, Inc. Support bracket for a radar detector. 291,176, 8-4-87, Cl. D8-380.000.
Stagl, Peter M., to Avnet, Inc. Decorative extrusion. 291,250, 8-4-87, Cl. D25-75.000.
Stagl, Peter M., to Avnet, Inc. Decorative extrusion. 291,251, 8-4-87, Cl. D25-75.000.
Stahel, Alwin J., to Drag Specialties, Inc. Motorcycle fuel pump cover. 291,188, 8-4-87, Cl. D12-126.000.
Stahel, Alwin J., to Drag Specialties, Inc. Motorcycle caliper cover. 291,189, 8-4-87, Cl. D12-126.000.
Stiso, S. Nicholas; and Zuk, Robert F., to Syntex (U.S.A.) Inc. Chromatography cassette. 291,185, 8-4-87, Cl. D10-81.000.
Storage Unlimited, Inc.: *See*—
Ray, Leroy, 291,165, Cl. D6-465.000.
Stowell, Davin; Viemeister, Tucker; and Dair, Thomas, to Sanyei Corporation. Electric can opener. 291,173, 8-4-87, Cl. D8-36.000.
Sugarbaker, Paul H.; and Hancock, John C., to Baxter Travenol Laboratories, Inc. Intrapelvic displacement prosthesis. 291,248, 8-4-87, Cl. D24-33.000.
Suzuki, Koji: *See*—
Ito, Masafumi; Suzuki, Koji; Hasegawa, Shigeru; and Takita, Haruki, 291,196, Cl. D14-5.000.
Swiss-Tex, Incorporated: *See*—
Greer, Richard E., Sr., 291,258, Cl. D32-40.000.
Syntex (U.S.A.) Inc.: *See*—
Stiso, S. Nicholas; and Zuk, Robert F., 291,185, Cl. D10-81.000.
T.A. Pelsue Company: *See*—
Beavers, Allan E., 291,243, Cl. D23-162.000.
Tackett, William C. Game board. 291,213, 8-4-87, Cl. D21-31.000.
Takahashi, Kazuaki: *See*—
Tamada, Kenji; Yamakawa; and Takahashi, Kazuaki, 291,208, Cl. D18-12.000.
Takasago USA, Inc.: *See*—
Harden, Theodore A.; and Scott, Richard E., 291,242, Cl. D23-150.000.
Takita, Haruki: *See*—
Ito, Masafumi; Suzuki, Koji; Hasegawa, Shigeru; and Takita, Haruki, 291,196, Cl. D14-5.000.
Tamada, Kenji; Yamakawa; and Takahashi, Kazuaki, to Silver Seiko Limited. Print wheel cartridge for typewriter. 291,208, 8-4-87, Cl. D18-12.000.
Tamaki, Yasuyuki: *See*—
Tsuruta, Takeshi; Yoshitani, Takuo; Kanoh, Shosaku; Kamiya, Eiichi; and Tamaki, Yasuyuki, 291,254, Cl. D14-113.000.
Tapdrup, Erik P., to Interlego A.G. Toy building unit. 291,217, 8-4-87, Cl. D21-108.000.
Teac Corporation: *See*—
Ito, Masafumi; Suzuki, Koji; Hasegawa, Shigeru; and Takita, Haruki, 291,196, Cl. D14-5.000.
Thoeny, Craig C.; and Thoeny, Mark G. Wood duck box. 291,257, 8-4-87, Cl. D30-3.000.

Thoeny, Mark G.: *See*—
Thoeny, Craig C.; and Thoeny, Mark G., 291,257, Cl. D30-3.000.
Toms, Maxwell H., to Commonwealth of Australia, The. Container interior. 291,178, 8-4-87, Cl. D9-345.000.
Tong, James K.; and Kelley, Brenda, to Pensa, Inc. Shoe upper. 291,141, 8-4-87, Cl. D2-314.000.
Tong, James K.; and MacGregor, Bruce, to Pensa, Inc. Shoe upper. 291,144, 8-4-87, Cl. D2-314.000.
Tong, James K.: *See*—
Kelley, Brenda; and Tong, James K., 291,147, Cl. D2-320.000.
Tsuruta, Takeshi; Yoshitani, Takuo; Kanoh, Shosaku; Kamiya, Eiichi; and Tamaki, Yasuyuki, to International Business Machines Corp. Image display monitor. 291,254, 8-4-87, Cl. D14-113.000.
Van Dyke, Lyle H. Shoulder support for telephone handset. 291,200, 8-4-87, Cl. D14-65.000.
Velbon International Corporation: *See*—
Nakatani, Koma, 291,153, Cl. D6-312.000.
Viemeister, Tucker: *See*—
Stowell, Davin; Viemeister, Tucker; and Dair, Thomas, 291,173, Cl. D8-36.000.
Vinyl Improvement Products Company: *See*—
Manning, John M., 291,249, Cl. D25-73.000.
Voigt, Christine J.: *See*—
Luyk, Harley E.; Boardman, Robert K.; Dahlgren, Jean E.; and Voigt, Christine J., 291,164, Cl. D6-465.000.
Wan, Albert, to Fee Tat Plastic Factory Limited. Insect killing lamp. 291,226, 8-4-87, Cl. D22-123.000.
Watanabe, Katsuhito, to Oki America, Inc. Handset for mobile telephone. 291,199, 8-4-87, Cl. D14-64.000.
Weilbacher, Eugene E., to Snyder Laboratories, Inc. Medical device clip or the like for attaching a surgical wound drainage evacuator or the like to various sites. 291,247, 8-4-87, Cl. D24-27.000.
Weisel, Charles W., Jr.; and Miller, Lewie H., Jr. Combined hand held portable computer and carrying case therefor. 291,201, 8-4-87, Cl. D14-100.000.
Wertheimer, Roger. Orthopedic chair. 291,155, 8-4-87, Cl. D6-335.000.
Worden Company, The: *See*—
Luyk, Harley E.; Boardman, Robert K.; Dahlgren, Jean E.; and Voigt, Christine J., 291,164, Cl. D6-465.000.
Xantech Corporation: *See*—
Ortega, Charles J., 291,253, Cl. D26-29.000.
Yamakawa: *See*—
Tamada, Kenji; Yamakawa; and Takahashi, Kazuaki, 291,208, Cl. D18-12.000.
Ygfors, Goran. Knife handle for slicing meat or similar article. 291,171, 8-4-87, Cl. D7-152.000.
Yoshitani, Takuo: *See*—
Tsuruta, Takeshi; Yoshitani, Takuo; Kanoh, Shosaku; Kamiya, Eiichi; and Tamaki, Yasuyuki, 291,254, Cl. D14-113.000.
Yuen, John S., to John Manufacturing Limited. Electric bug killer lamp. 291,223, 8-4-87, Cl. D22-123.000.
Yuen, John S., to John Manufacturing Limited. Electric bug killer lamp. 291,224, 8-4-87, Cl. D22-123.000.
Yuen, John S., to John Manufacturing Limited. Electric bug killer lamp. 291,225, 8-4-87, Cl. D22-123.000.
Zimmer, Inc.: *See*—
Lower, Jerry L., 291,246, Cl. D24-26.000.
Zuk, Robert F.: *See*—
Stiso, S. Nicholas; and Zuk, Robert F., 291,185, Cl. D10-81.000.

LIST OF STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE 4TH DAY OF AUGUST, 1987

Agarwal, Pawan K.: *See*—
Kowalik, Ralph M.; Wagensommer, Joseph; Duvdevani, Ilan; and Agarwal, Pawan K., H316, Cl. 137-13.000.
Betts, Robert E., to United States of America, Army. Safety container for transporting small quantities of explosives. H314, 8-4-87, Cl. 206-523.000.
Clayson, Arthur E., to United States of America, Navy. Gun blast diffuser. H319, 8-4-87, Cl. 89-37.160.
Duvdevani, Ilan: *See*—
Kowalik, Ralph M.; Wagensommer, Joseph; Duvdevani, Ilan; and Agarwal, Pawan K., H316, Cl. 137-13.000.
Exxon Research and Engineering Co.: *See*—
Kowalik, Ralph M.; Wagensommer, Joseph; Duvdevani, Ilan; and Agarwal, Pawan K., H316, Cl. 137-13.000.
Genco, Louis V.; and Task, Harry L., to United States of America, Air Force. Method of measuring optical properties of a transparency. H315, 8-4-87, Cl. 356-125.000.
Gladden, Bruce W. Holographic and xographic magnetic note holder structures. H317, 8-4-87, Cl. 40-453.000.
Kowalik, Ralph M.; Wagensommer, Joseph; Duvdevani, Ilan; and Agarwal, Pawan K., to Exxon Research and Engineering Co. Hydrocarbon drag reduction with interpolymer complexes containing novel sulfo-octene. H316, 8-4-87, Cl. 137-13.000.
Machine Builders and Design, Inc.: *See*—
Mims, Herman D., H318, Cl. 198-446.000.
Mims, Herman D., to Machine Builders and Design, Inc. Rotary guide device. H318, 8-4-87, Cl. 198-446.000.
Reuter, Howard A., to United States of America, Air Force. Robotic kitting. H320, 8-4-87, Cl. 364-468.000.
Riley, Marc J.; and Sterner, Harold E., to United States of America, Air Force. Machined two-piece microwave waveguide. H321, 8-4-87, Cl. 333-239.000.
Simons, Brent S., to United States of America, Navy. Laser diode power controller. H322, 8-4-87, Cl. 372-29.000.
Sterner, Harold E.: *See*—
Riley, Marc J.; and Sterner, Harold E., H321, Cl. 333-239.000.
Task, Harry L.: *See*—
Genco, Louis V.; and Task, Harry L., H315, Cl. 356-125.000.
United States of America
Air Force: *See*—
Genco, Louis V.; and Task, Harry L., H315, Cl. 356-125.000.
Reuter, Howard A., H320, Cl. 364-468.000.
Riley, Marc J.; and Sterner, Harold E., H321, Cl. 333-239.000.
Army: *See*—
Betts, Robert E., H314, Cl. 206-523.000.
Navy: *See*—
Clayson, Arthur E., H319, Cl. 89-37.160.
Simons, Brent S., H322, Cl. 372-29.000.
Wagensommer, Joseph: *See*—
Kowalik, Ralph M.; Wagensommer, Joseph; Duvdevani, Ilan; and Agarwal, Pawan K., H316, Cl. 137-13.000.

CLASSIFICATION OF PATENTS

ISSUED AUGUST 4, 1987

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

17 4,683,592
82 4,683,593
105 4,683,594
4,683,595
174 4,683,596

CLASS 4

295 4,683,597
301 4,683,598
490 4,683,599

CLASS 5

99 C 4,683,600
431 4,683,601
451 4,683,602

CLASS 8

408 4,684,371

CLASS 07

92 4,684,396

CLASS 15

104.94 4,683,603
176 4,683,604
250.21 4,683,605
250.42 4,683,606
323 4,683,607
328 4,683,608

CLASS 16

114 R 4,683,609
115 4,683,610
225 4,683,611
240 4,683,612
262 4,683,613
362 4,683,614

CLASS 17

1 R 4,683,615
11 4,683,616
41 4,683,617
51 4,683,618

CLASS 19

159 A 4,683,619

CLASS 24

71 SK 4,683,620
95 4,683,621
458 4,683,622

CLASS 28

141 4,683,624
191 4,683,625

CLASS 29

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110 4,683,627
116 R 4,683,628
159 A 4,683,629
159.01 4,683,630
278 4,683,631
281.1 4,683,632
407 4,683,633
412 4,683,634
432 4,683,635
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568 4,683,638
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623.5 4,683,648
726 4,683,649
736 4,683,650
786 4,683,651
829 4,683,652
830 4,683,653
832 4,683,654

CLASS 30

123.7 4,683,655
162 4,683,656
170 4,683,657
275 4,683,658
381 4,683,659
382 4,683,660

CLASS 33

169 B 4,683,661
233 4,683,662
288 4,683,663

CLASS 34

35 4,683,664
65 4,683,665
67 4,683,666
203 4,683,667
229 4,683,668

CLASS 36

129 B1 4,451,996

CLASS 40

414 4,683,669
620 4,683,670

CLASS 42

74 4,683,671

CLASS 43

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3 B1 4,062,141
139 4,683,673

CLASS 44

51 4,684,372
63 4,684,373

CLASS 47

83 4,683,674

CLASS 48

197 R 4,684,374
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CLASS 49

181 4,683,675
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426 4,683,678

CLASS 51

5 D 4,683,679
34 J 4,683,680
169 4,683,681
170 R 4,683,682
377 4,683,683
429 4,683,684

CLASS 52

12 4,683,685
64 4,683,686
72 4,683,687
79.1 4,683,688
80 4,683,689
126.2 4,683,690
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208 4,683,694
221 4,683,695
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520 4,683,697
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775 4,683,699

CLASS 53

138 R 4,683,700
167 4,683,701
433 4,683,702
456 4,683,703
461 4,683,704
462 4,683,705
485 4,683,706
502 4,683,707
540 4,683,708

CLASS 54

66 4,683,709
82 4,683,710

CLASS 55

16 4,684,376
26 4,684,377
96 4,684,378
227 4,684,379
274 4,684,380
316 4,684,381
4,684,382

CLASS 57

81 4,683,711
4,683,712
281 4,683,713

CLASS 60

39.02 4,683,714
39.06 4,683,715
226.1 4,683,716
4,683,717
327 4,683,718
398 4,683,719
496 4,683,720
527 4,683,721
656 4,683,722

CLASS 62

6 4,683,723
85 4,683,724
199 4,683,725
503 4,683,726

CLASS 65

3.12 4,684,383
4,684,384
17 4,684,385
18.1 4,684,386
18.4 4,684,387
24 4,684,388
4,684,389
133 4,684,390

CLASS 66

207 4,683,727

CLASS 70

14 4,683,728
58 4,683,729
59 4,683,730
69 4,683,731
118 4,683,732
134 4,683,733
163 4,683,734
168 4,683,735
208 4,683,736
253 4,683,737
332 4,683,738
363 4,683,739
419 4,683,740
432 4,683,741

CLASS 71

24 4,684,391
76 4,684,392
90 4,684,393
4,684,394
92 4,684,395
96 4,684,397
98 4,684,398

CLASS 72

43 4,683,742
88 4,683,743
243 4,683,744

CLASS 73

40.7 4,683,749
49.2 4,683,745
118.1 4,683,746
119 R 4,683,747
226 4,683,748
606 4,683,750
4,683,751
642 4,683,752
655 4,683,753
708 4,683,754
727 4,683,755
747 4,683,756
756 4,683,757
780 4,683,758
861.04 4,683,759
861.22 4,683,760
863.58 4,683,762
864.34 4,683,761

CLASS 74

18.1 4,683,763
41 4,683,764
60 4,683,765
333 4,683,766
409 4,683,767
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479 4,683,772
4,683,773
501 R 4,683,774
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765 4,683,776
850 4,683,777
858 4,683,778
861 4,683,779

CLASS 75

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0.5 BB 4,684,399
51.5 4,684,402
80 4,684,403
118 R 4,684,404
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244 4,684,406

CLASS 76

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108 A 4,683,781

CLASS 81

3.57 4,683,782
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22 4,683,784

CLASS 82

1 C 4,683,785
2 B 4,683,786
18 4,683,787
47 4,683,788

CLASS 83

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356.3 4,683,790
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CLASS 84

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380 C 4,683,796

CLASS 89

1.13 4,683,797
1.816 4,683,798
11 4,683,799
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40.12 4,683,801

CLASS 91

516 4,683,802

CLASS 92

66 4,683,806
71 4,683,803
4,683,804
129 4,683,805
169 4,683,807
208 4,683,808
4,683,809
212 4,683,810

CLASS 98

42.2 4,683,811

CLASS 99

289 R 4,683,812
353 4,683,813

CLASS 100

37 4,683,814
88 4,683,815
121 4,683,816

CLASS 101

93.03 4,683,817
93.04 4,683,818
93.22 4,683,819
93.36 4,683,820
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382 MV 4,683,822

CLASS 102

229 4,683,823
436 4,683,824

CLASS 105

148 4,683,825

CLASS 106

90 4,684,407
300 4,684,408
311 4,684,409

CLASS 111

7 4,683,826

CLASS 112

121.12 4,683,827
294 4,683,828

CLASS 114

125 4,683,829
163 4,683,830
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258 4,683,832
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CLASS 118

231 4,683,835
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CLASS 119

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CLASS 122

4 D 4,683,840
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CLASS 123

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41.74 4,683,844
73 A 4,683,846
73 PP 4,683,845
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192 B 4,683,849
195 C 4,683,850
196 S 4,683,851
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568 4,683,863
575 4,683,864

CLASS 124

24 R 4,683,865

CLASS 126

25 B 4,683,866
41 R 4,683,867
123 4,683,623
193 4,683,868
204 4,683,869
271.1 4,683,870
340 4,683,871
449 4,683,872

CLASS 127

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CLASS 128

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6 4,683,874
62 A 4,683,875
80 R 4,683,876
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92 YP 4,683,878
200.26 4,683,879
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204.26 4,683,881
207.17 4,683,882
303 R 4,683,883
303.14 4,683,884
334 R 4,683,885
376 4,683,886
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395 4,683,889
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785 4,683,896

CLASS 132

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76.4 4,683,898
82 R 4,683,899

CLASS 134

15 4,684,411
19 4,684,412

CLASS 135

88 4,683,900
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105 4,683,902

CLASS 136

258 4,684,761

CLASS 137

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78.3 4,683,904
329.1 4,683,905
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505.11 4,683,909
519 4,683,910
561 A 4,683,911
580 4,683,912
625.4 4,683,913
625.48 4,683,914
625.63 4,683,915
854 4,683,916

CLASS 138

121 4,683,917

CLASS 140

73 4,683,918
92.2 4,683,919
93 A 4,683,920

CLASS 141

1 4,683,921
9 4,683,922
392 4,683,923

CLASS 144

3 D 4,683,924
145 R 4,683,925
178 4,683,926

CLASS 148

11.5 R 4,684,414
430 4,684,416

CLASS 150

52 R 4,683,927

CLASS 152

209 R 4,683,928
313 4,683,929
410 4,683,930

CLASS 156

64 4,684,417
91 4,684,418
93 4,684,419
116 4,684,420
124 4,684,421
126 4,684,422
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257 4,684,428
323 4,684,429
366 4,684,430
394.1 4,684,431
500 4,684,432
517 4,684,433
622 4,684,434
632 4,684,435
643 4,684,436
4,684,437
649 4,684,438

CLASS 157

13 4,683,931

CLASS 160

133 4,683,932
273 R 4,683,933
328 4,683,934
331 4,683,935

CLASS 162

111 4,684,439
184 4,684,440
198 4,684,441
242 4,684,442
255 4,684,443
380 4,684,444

CLASS 164

122.1 4,683,936
125 4,683,937
413 4,683,938

CLASS 165

12 4,683,939
32 4,683,940
47 4,683,941
53 4,683,942

CLASS 166

63 4,683,943
65.1 4,683,944
68.5 4,683,945
170 4,683,946
251 4,683,947
263 4,683,948
270 4,683,949
271 4,683,950
4,683,951
293 4,683,952
294 4,683,953
307 4,683,954
327 4,683,955
383 4,683,956

CLASS 172

253 Re.32,467
311 4,683,957
705 4,683,958
795 4,683,959

CLASS 173

91 4,683,960
93 4,683,961
163 4,683,962

CLASS 174

36 4,684,762
52 FP 4,684,763
68.5 4,684,765
91 4,684,764
115 4,684,766

CLASS 175

66 4,683,963
107 4,683,964
385 4,683,965

CLASS 177

25 4,683,966
144 4,683,967

CLASS 180

6.48 4,683,969
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252 4,683,973
274 4,683,974
289 4,683,975
311 4,683,976
334 4,683,977

CLASS 181

280 4,683,978
286 4,683,979

CLASS 182

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199 4,683,981
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CLASS 184

6.12 4,683,985
6.2 4,683,984

CLASS 185

39 4,683,986

CLASS 187

9 E 4,683,987
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121 4,683,989
134 4,683,990

CLASS 188

197 4,683,991
299 4,683,992
321.11 4,683,993

CLASS 192

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3.61 4,683,994
8 C 4,683,995
58 B 4,683,999
58 C 4,683,997
4,683,998

67 R 4,684,000
70 4,684,001
70.25 4,684,002
85 CA 4,684,003
87.13 4,684,004
98 4,684,005
106.2 4,684,006
4,684,007

CLASS 198

436 4,684,008
731 4,684,009
765 4,684,010
779 4,684,011
803.01 4,684,012

CLASS 200

5 A 4,684,767
61.43 4,684,768
61.89 4,684,769
67 R 4,684,770
144 B 4,684,771
144 R 4,684,772
148 R 4,684,773
275 4,684,774
276 4,684,775

CLASS 204

1 T 4,684,445
15 4,684,446
38.5 4,684,447
71 4,684,448
75 4,684,449
118 4,684,450
141.5 4,684,451
157.94 4,684,452
182.4 4,684,453
192.2 4,684,454
212 4,684,455

CLASS 206

5.1 4,684,014
19 4,684,015
45.13 4,684,016
235 4,684,017
306 4,684,018
309 4,684,019
328 4,684,020
334 4,684,021
347 4,684,022
423 4,684,013
459 4,684,023
464 4,684,024
484 4,684,025
522 4,684,026

CLASS 208

143 4,684,456
188 4,684,457

CLASS 209

31 4,684,458
166 4,684,459

CLASS 210

90 4,684,460
96.1 4,684,461
97 4,684,462
172 4,684,463
189 4,684,464
198.2 4,684,465
227 4,684,466
519 4,684,467
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632 4,684,469
639 4,684,470
665 4,684,471
720 4,684,472

CLASS 211

40 4,684,027
51 4,684,028
78 4,684,029
88 4,684,030

CLASS 212

179 4,684,031

CLASS 215

1 A 4,684,032
269 4,684,033

CLASS 219

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10.55 M 4,684,776
89 4,684,778
121 EA 4,684,782
121 LD 4,684,779
121 LQ 4,684,780
121 LU 4,684,781
210 4,684,783
212 4,684,785
216 4,684,784
297 4,684,786
400 4,684,787
413 4,684,788
497 4,684,789

505 4,684,790

CLASS 220

6 4,684,034
346 4,684,035

CLASS 221

61 4,684,036

CLASS 222

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89 4,684,038
129.1 4,684,039
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161 4,684,041
327 4,684,042
386 4,684,043
4,684,044
451 4,684,046
456 4,684,045

CLASS 224

253 4,684,047
326 4,684,048
329 4,684,049

CLASS 227

10 4,684,050
19 4,684,051

CLASS 228

122 4,684,052
158 4,684,053
180.1 4,684,054
4,684,055
4,684,056
187 4,684,057

CLASS 229

17 R 4,684,058
52 B 4,684,059

CLASS 235

380 4,684,791
384 4,684,792
449 4,684,793
4,684,794
457 4,684,795

CLASS 236

11 4,684,060
20 R 4,684,061

CLASS 239

1 4,684,062
2.1 4,684,063
223 4,684,064
224 4,684,065
229 4,684,066
533.3 4,684,067
665 4,684,068

CLASS 241

79.1 4,684,069
79.3 4,684,070
80 4,684,071
172 4,684,072
247 4,684,073

CLASS 242

18 DD 4,684,074
55.42 4,684,075
100.1 4,684,076
107.6 4,684,077
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CLASS 244

3.22 4,684,080
58 4,684,081
137.2 4,684,079
142 4,684,082
151 A 4,684,083
168 4,684,084
178 4,684,085

CLASS 248

68.1 4,684,086
97 4,684,087
123.1 4,684,088
124 4,684,089
155 4,684,090
166 4,684,091
200.1 4,684,092
201 4,684,093
245 4,684,094
255 4,684,095
309.1 4,684,096
354.3 4,684,097
407 4,684,098
447.1 4,684,099
550 4,684,100

CLASS 249

144 4,684,101

CLASS 250

201 4,684,796
4,684,797
4,684,798
4,684,799
211 J 4,684,800
221 4,684,801
235 4,684,802
324 4,684,803
338 4,684,804
343 4,684,805
374 4,684,806
381 4,684,807
396 R 4,684,808
492.2 4,684,809
515.1 4,684,810
561 4,684,811
578 4,684,812

CLASS 251

7 4,684,102
58 4,684,103
129.05 4,684,104
150 4,684,105
335.2 4,684,106

CLASS 252

8 B1 4,226,728
49.8 4,684,473
75 4,684,474
4,684,475
299.61 4,684,476
4,684,477
299.63 4,684,478
307 4,684,479
478 4,684,480
510 4,684,481

CLASS 256

19 4,684,107
24 4,684,108

CLASS 260

404.5 4,684,482
502.5 F 4,684,483

CLASS 261

35 4,684,484
4,684,485
36.1 4,684,486

CLASS 264

22 4,684,487
40.2 4,684,488
101 4,684,489
296 4,684,490

CLASS 266

216 4,684,109

CLASS 267

52 4,684,110
103 4,684,111

CLASS 269

8 4,684,112
21 4,684,113
57 4,684,114
136 4,684,115

CLASS 270

54 4,684,116
4,684,117
58 4,684,118

CLASS 271

4 4,684,119
18.3 4,684,120

CLASS 272

97 4,684,121
119 4,684,122
4,684,123
128 4,684,124
130 4,684,125
134 4,684,126

CLASS 273

1 G 4,684,127
1 GC 4,684,128
1.5 R 4,684,129
67 A 4,684,130
73 F 4,684,131
150 4,684,132
186 A 4,684,133
261 4,684,134
269 4,684,135
271 4,684,136
428 4,684,137

CLASS 279

7 4,684,138
62 4,684,139

CLASS 280

11.26 4,684,140
40 4,684,141
81 R 4,684,142
216 4,684,143
281 R 4,684,144
414.1 4,684,145
626 4,684,146
628 4,684,147

647 4,684,148
650 4,684,149
661 4,684,150
784 4,684,151
785 4,684,152
808 4,684,153

CLASS 282

29 R 4,684,154

CLASS 285

16 4,684,155
27 4,684,156
256 4,684,157

CLASS 290

4 A 4,684,813
31 4,684,814
38 R 4,684,816
53 4,684,815
55 4,684,817

CLASS 292

76 4,684,158
268 4,684,159
340 4,684,160

CLASS 294

1.1 4,684,161
82.12 4,684,162
149 4,684,163

CLASS 296

37.7 4,684,164
136 4,684,165
146 4,684,166
202 4,684,167
217 4,684,168
221 4,684,169

CLASS 297

19 4,684,170
47 4,684,171
248 4,684,172
300 4,684,173
367 4,684,174
379 4,684,175

CLASS 299

91 4,684,176

CLASS 303

100 4,684,177

CLASS 307

10 R 4,684,818
4,684,819
106 4,684,820
4,684,821
125 4,684,822
247 R 4,684,823
270 4,684,824
272 A 4,684,826
328 4,684,825
413 4,684,827
425 4,684,828
449 4,684,829
465 4,684,830
475 4,684,831
520 4,684,832
525 4,684,833

CLASS 310

24 4,684,834
59 4,684,835
83 4,684,836
87 4,684,837
93 4,684,838
154 4,684,839
162 4,684,840
313 B 4,684,841
316 4,684,842
355 4,684,843

CLASS 312

221 4,684,178

CLASS 313

30 4,684,844
341 4,684,845
475 4,684,846
493 4,684,847

CLASS 315

111.81 4,684,848
169.4 4,684,849
209 R 4,684,850
224 4,684,851
241 R 4,684,852

CLASS 318

16 4,684,853
140 4,684,854
254 4,684,855
310 4,684,856
313 4,684,857
317 4,684,858
4,684,859

567 4,684,861
568 4,684,862
599 4,684,863
696 4,684,860
4,684,864
4,684,865
4,684,866
701 4,684,867
802 4,684,868

CLASS 320

2 4,684,869
20 4,684,870
21 4,684,871
45 4,684,872

CLASS 322

47 4,684,873

CLASS 323

204 4,684,875
268 4,684,876
269 4,684,877
279 4,684,878
289 4,684,879
316 4,684,880
354 4,684,881
356 4,684,882

CLASS 324

71.5 4,684,883
73 R 4,684,884
4,684,885
132 4,684,886
158 R 4,684,887
207 4,684,888
308 4,684,889
309 4,684,890
4,684,891
4,684,892
312 4,684,893
318 4,684,894
322 4,684,895
399 4,684,896

CLASS 328

162 4,684,897

CLASS 329

104 4,684,898

CLASS 330

149 4,684,899

CLASS 331

3 4,684,900
25 4,684,901
38 4,684,902
78 4,684,903
117 R 4,684,904

CLASS 333

81 R 4,684,905
125 4,684,874
143 4,684,906
196 4,684,907
252 4,684,908

CLASS 335

128 4,684,909
274 4,684,910
288 4,684,911

CLASS 336

185 4,684,912

CLASS 337

140 4,684,913
198 4,684,914
276 4,684,915

CLASS 338

308 4,684,916

CLASS 339

59 M 4,684,188

CLASS 340

59 4,684,917
73 4,684,918
84 4,684,919
310 A 4,684,920
347 AD 4,684,924
4,684,925
347 DA 4,684,922
347 DD 4,684,921
4,684,923
365 R 4,684,926
384 E 4,684,927
506 Re.32,468
521 4,684,928
541 4,684,929
551 4,684,930
563 4,684,931
564 4,684,932
572 4,684,933
703 4,684,942
712 4,684,934

717 4,684,935
721 4,684,936
728 4,684,937
747 4,684,938
784 4,684,939
815.2 4,684,940
825.06 4,684,944
825.52 4,684,941
825.56 4,684,945
825.72 4,684,943
855 4,684,946
858 4,684,947
970 4,684,948

CLASS 342

41 4,684,949
94 4,684,950
351 4,684,955
362 4,684,951

CLASS 343

700 MS 4,684,952
725 4,684,953
909 4,684,954

CLASS 346

1.1 4,684,956
4,684,957
7 4,684,958
76 PH 4,684,959
4,684,960
139 A 4,684,961
140 R 4,684,962
4,684,963
215 B1 3,900,669

CLASS 350

96.12 4,684,206
96.14 4,684,207
96.15 4,684,208
4,684,209
96.20 4,684,210
4,684,211
96.21 4,684,205
4,684,212
96.23 4,684,213
4,684,214
96.29 4,684,215
279 4,684,216
319 4,684,217
339 F 4,684,218
343 4,684,219
350 R 4,684,220
413 4,684,221
420 4,684,222
427 4,684,223
445 4,684,224
518 4,684,225

CLASS 351

123 4,684,226
205 4,684,227

CLASS 354

4 4,684,228
106 4,684,229
293 4,684,230
295 4,684,231
400 4,684,232
4,684,233
421 4,684,234

CLASS 355

3 DD 4,684,236
3 R 4,684,235
8 4,684,237
10 4,684,238
14 R 4,684,239
4,684,240
14 SH 4,684,241
4,684,243
15 4,684,242

CLASS 356

39 4,684,244
41 4,684,245
124 4,684,246
152 4,684,247
4,684,248
4,684,249
246 4,684,250
315 4,684,251
328 4,684,252
333 4,684,253
346 4,684,255
367 4,684,256
374 4,684,257
409 4,684,258

CLASS 357

17 4,684,964
22 4,684,965
4,684,966
23.11 4,684,967
30 4,684,968
4,684,969
35 4,684,970
42 4,684,971
59 4,684,972
68 4,684,973
4,684,974
70 4,684,975

CLASS 358

31 4,684,976
4,684,977
75 4,684,978
4,684,979
86 4,684,980
4,684,981
107 4,684,982
135 4,684,983
136 4,684,984
140 4,684,985
148 4,684,986
4,684,987
154 4,684,988
167 4,684,989
183 4,684,990
213.11 4,684,991
213.12 4,684,992
213.31 4,684,993
217 4,684,994
227 4,684,995
231 4,684,996
263 4,684,997
293 4,684,998
294 4,684,999
332 4,685,000
342 4,685,001

CLASS 360

9.1 4,685,002
14.1 4,685,003
32 4,685,004
53 4,685,005
64 4,685,006
78 4,685,007
85 4,685,008
95 4,685,009
97 4,685,010
4,685,011
121 4,685,013
125 4,685,012
126 4,685,014
128 4,685,015
132 4,685,016
133 4,685,017

CLASS 361

1 4,685,018
2 4,685,019
18 4,685,020
42 4,685,021
44 4,685,022
88 4,685,023
93 4,685,024
106 4,685,025
308 4,685,026
4,685,027
334 4,685,028
359 4,685,029
400 4,685,030
412 4,685,032
413 4,685,031
414 4,685,033
424 4,685,034
429 4,685,035

CLASS 362

61 4,685,036
276 4,685,037
352 4,685,038

CLASS 363

16 4,685,039
17 4,685,040
40 4,685,041
41 4,685,042
43 4,685,043
51 4,685,044
68 4,685,045
89 4,685,046
126 4,685,047
127 4,685,048
159 4,685,049

CLASS 364

152 4,685,050
184 4,685,053
191 4,685,054
200 4,685,055
4,685,056
4,685,057
4,685,058
415 4,685,059
419 4,685,060
424 4,685,061
424.1 4,685,051
4,685,062
426 4,685,052
472 4,685,063
474 4,685,064
485 4,685,065
506 4,685,069
509 4,685,066
513 4,685,067
518 4,685,068
522 4,685,070
526 4,685,071
551 4,685,072
4,685,073
564 4,685,074
569 4,685,075
736 4,685,076
759 4,685,077
770 4,685,078
784 4,685,079
900 4,685,080

CLASS 365

1 4,685,081
49 4,685,082
185 4,685,083
189 4,685,084
190 4,685,085
203 4,685,086
227 4,685,087
230 4,685,088
233 4,685,089

CLASS 366

185 4,684,259
340 4,684,254

CLASS 367

20 4,685,090
31 4,685,091
35 4,685,092
89 4,685,093
183 4,685,094

CLASS 368

16 4,684,260
107 4,684,261
157 4,684,262
220 4,684,263
283 4,684,264

CLASS 369

36 4,685,095
44 4,685,096
54 4,685,097
59 4,685,098

CLASS 370

15 4,685,102
30 4,685,099
58 4,685,100
4,685,103
67 4,685,104
84 4,685,101
86 4,685,105
112 4,685,106

CLASS 372

6 4,685,107
18 4,685,111
19 4,685,108
61 4,685,109
103 4,685,110

CLASS 373

72 4,685,112

CLASS 374

43 4,684,265

CLASS 375

7 4,685,113
22 4,685,114
25 4,685,115

CLASS 376

203 4,684,491
4,684,492
252 4,684,493
313 4,684,494
352 4,684,495
4,684,496
419 4,684,497
446 4,684,498
4,684,499
4,684,500
4,684,501
4,684,502
4,684,503
447 4,684,504

CLASS 377

51 4,685,116
60 4,685,117

CLASS 378

114 4,685,118
130 4,685,119

CLASS 379

26 4,685,120
90 4,685,121
4,685,122
93 4,685,123
95 4,685,124
96 4,685,125
146 4,685,126
221 4,685,127
272 4,685,128
324 4,685,129
413 4,685,130

CLASS 380

4 4,683,968
20 4,685,131
46 4,685,132

CLASS 381

3 4,685,133
17 4,685,134
52 4,685,135
108 4,685,136
174 4,685,137

CLASS 382

1 4,685,139
6 4,685,140
7 4,685,141
12 4,685,138
13 4,685,142
25 4,685,143
49 4,685,144
52 4,685,145
54 4,685,146
66 4,685,147

CLASS 383

37 4,685,148

CLASS 384

4,684,266
294 4,684,267
574 4,684,268

CLASS 400

82 4,684,269
121 4,684,270
241.1 4,684,271
242 4,684,272
247 4,684,273
304 B1 4,462,708
320 4,684,274
479 4,684,275
630 4,684,276
639.1 4,684,277

CLASS 403

84 4,684,278
136 4,684,279
157 4,684,280
197 4,684,281
219 4,684,282
299 4,684,283
320 4,684,284
331 4,684,285
407.1 4,684,286

CLASS 404

6 4,684,287
35 4,684,288
75 4,684,289

CLASS 405

184 4,684,290
190 4,684,291
202 4,684,292
224 4,684,293
286 4,684,294

CLASS 406

50 4,684,295
153 4,684,296

CLASS 407

41 4,684,297

CLASS 408

59 4,684,298
115 R 4,684,299

CLASS 409

134 4,684,300
232 4,684,301
233 4,684,302
235 4,684,303

CLASS 411

171 4,684,304
174 4,684,305

CLASS 414

22 4,684,306
31 4,684,307
96 4,684,308
224 4,684,309
427 4,684,310
535 4,684,311
735 4,684,312
4,684,313
745 4,684,314
749 4,684,315

CLASS 415

2 A 4,684,316
73 4,684,317
113 4,684,318
164 4,684,319
190 4,684,320
202 4,684,321

CLASS 416

95 4,684,322
97 R 4,684,323
189 4,684,324
215 4,684,325
4,684,326

CLASS 417

38 4,684,327
322 4,684,328
357 4,684,329
360 4,684,330
366 4,684,331
397 4,684,332
420 4,684,333
568 4,684,334

CLASS 418

189 4,684,335

CLASS 420

81 4,684,505
552 4,684,506

CLASS 422

12 4,684,507
46 4,684,508
54 4,684,509

CLASS 423

210 4,684,510
305 4,684,511
321 R 4,684,512
349 4,684,513
495 4,684,515
574 R 4,684,514

CLASS 424

19 4,684,516
52 4,684,517
4,684,518
80 4,684,519
94.10 4,684,520
101 4,684,521
195.1 4,684,522
441 4,684,523
469 4,684,524

CLASS 425

8 4,684,336
33 4,684,338
135 4,684,337
389 4,684,339

CLASS 426

16 4,684,525
19 4,684,526
46 4,684,527
74 4,684,528
237 4,684,529
330.4 4,684,530
399 4,684,531
533 4,684,532
575 4,684,533

CLASS 427

3 4,684,534
38 4,684,535
47 4,684,536
53.1 4,684,537
54.1 4,684,538
64 4,684,539
71 4,684,540
96 4,684,543
4,684,544
98 4,684,545
130 4,684,546
131 4,684,547
197 4,684,548
221 4,684,549
345 4,684,551
437 4,684,550

CLASS 428

4 4,684,552
35 4,684,553
4,684,554
36 4,684,555
4,684,556
40 4,684,557
4,684,558
4,684,559
100 4,684,560
131 4,684,561
141 4,684,562
182 4,684,563
207 4,684,564
216 4,684,565
220 4,684,566
224 4,684,567
257 4,684,568
265 4,684,569
286 4,684,570
296 4,684,571
314.8 4,684,572
323 4,684,573
349 4,684,574
402.2 4,684,575
434 4,684,576
441 4,684,577
447 4,684,578
462 4,684,579
606

CLASS 429

9 4,684,580
19 4,684,581
39 4,684,582
48 4,684,583
51 4,684,584
69 4,684,585
115 4,684,586
4,684,587
4,684,588
184 4,684,589
194 4,684,590
218 4,684,591

CLASS 430

6 4,684,592
4,684,593
49 4,684,594
94 4,684,595
110 4,684,596
190 4,684,597
269 4,684,598
270 4,684,599
271 4,684,600
284 4,684,601
363 4,684,602
372 4,684,603
375 4,684,604
537 4,684,605
546 4,684,606
567 4,684,607
629 4,684,608

CLASS 431

80 4,684,340
242 4,684,341

CLASS 432

103 4,684,342

CLASS 433

81 4,684,344
92 4,684,345
166 4,684,346
214 4,684,343
228.1 4,684,347

CLASS 434

156 4,684,348
308 4,684,349

CLASS 435

7 4,684,609
61 4,684,610
172.3 4,684,611
240.5 4,684,612
301 4,684,613
316 4,684,614

CLASS 436

16 4,684,615

CLASS 437

7 4,683,644
17 4,684,413
40 4,683,642
41 4,683,640
4,683,641
4,683,645
63 4,683,637
173 4,684,541
203 4,683,643
228 4,684,415
245 4,684,542

CLASS 439

27 4,684,179
29 4,684,180
59 4,684,181
64 4,684,184
68 4,684,182
77 4,684,183
171 4,684,186
246 4,684,191
259 4,684,193
260 4,684,194
374 4,684,192
387 4,684,200
404 4,684,195
4,684,197
411 4,684,196
502 4,684,185
571 4,684,198
585 4,684,201
587 4,684,189
4,684,190

CLASSIFICATION OF PATENTS

600 4,684,187
610 4,684,199
751 4,684,203
752 4,684,202
863 4,684,204

CLASS 440

9 4,684,350
89 4,684,351

CLASS 445

7 4,684,352
51 4,684,353

CLASS 446

130 4,684,354
464 4,684,355

CLASS 455

56 4,685,149
183 4,685,150

CLASS 464

111 4,684,356

CLASS 474

101 4,684,357
148 4,684,358

CLASS 493

211 4,684,359
367 4,684,360

CLASS 494

41 4,684,361

CLASS 501

49 4,684,616

CLASS 502

214 4,684,617
313 4,684,618
330 4,684,619

CLASS 514

11 4,684,620
4,684,621
4,684,622
12 4,684,623
15 4,684,624
19 4,684,625
25 4,684,626
4,684,627
26 4,684,628
34 4,684,629
49 4,684,630
51 4,684,631
78 4,684,632
4,684,633
144 4,684,634
170 4,684,635
176 4,684,636
185 4,684,637
4,684,638
194 4,684,639
195 4,684,640
201 4,684,641
4,684,642
204 4,684,643
210 4,684,644
213 4,684,645
221 4,684,646
222 4,684,647
249 4,684,648
4,684,649
252 4,684,650
253 4,684,651
254 4,684,652
258 4,684,653
259 4,684,654
274 4,684,655
4,684,656
313 4,684,657
338 4,684,658
396 4,684,659
423 4,684,660
443 4,684,661
475 4,684,664
493 4,684,663
543 4,684,665
557 4,684,666
619 4,684,748

CLASS 521

32 4,684,667
56 4,684,668
90 4,684,669

CLASS 522

13 4,684,670
31 4,684,671

CLASS 523

100 4,684,672
116 4,684,673
205 4,684,674
220 4,684,675
411 4,684,676
435 4,684,677
466 4,684,678

CLASS 524

91 4,684,679
4,684,680
127 4,684,681
141 4,684,682
220 4,684,683
227 4,684,684
270 4,684,685
281 4,684,686
291 4,684,687
336 4,684,688
371 4,684,689
419 4,684,690
534 4,684,691
548 4,684,692
600 4,684,693
730 4,684,694

CLASS 525

36 4,684,695
68 4,684,696
99 B1 4,391,949
100 4,684,697
326.9 4,684,698
471 4,684,699
481 4,684,700
507 4,684,701
528 4,684,702

CLASS 526

88 4,684,703
200 4,684,704
246 4,684,705
262 4,684,706
290 4,684,707

CLASS 527

312 4,684,708

CLASS 528

15 4,684,709
26 4,684,710
86 4,684,711
190 4,684,712
315 4,684,713
353 4,684,714
493 4,684,715

CLASS 530

328 4,684,716
351 4,684,723

CLASS 534

586 4,684,717
4,684,718

CLASS 536

119 4,684,719
124 4,684,720

CLASS 540

126 4,684,721
203 4,684,722
355 4,684,724
565 4,684,725

CLASS 544

69 4,684,726
127 4,684,727
182 4,684,728
357 4,684,729
408 4,684,730

CLASS 546

138 4,684,731
144 4,684,732
337 4,684,733
345 4,684,734

CLASS 548

308 4,684,735
309 4,684,736
452 4,684,662

CLASS 549

240 4,684,737
242 4,684,738
350 4,684,739
464 4,684,740

CLASS 556

472 4,684,741

CLASS 558

81 4,684,742
374 4,684,743
388 4,684,744

CLASS 560

41 4,684,745

CLASS 564

38 4,684,746
081 4,684,747

CLASS 568

779 4,684,752
797 4,684,749
883 4,684,750
898 4,684,751

CLASS 570

206 4,684,753

CLASS 585

21 4,684,754
257 4,684,755
330 4,684,756
331 4,684,757
608 4,684,758
652 4,684,759
670 4,684,760

CLASS 604

54 4,684,362
98 4,684,363
123 4,684,364
126 4,684,365
130 4,684,366
140 4,684,367
152 4,684,368
272 4,684,369

CLASS 623

66 4,684,370

CLASSIFICATION OF DESIGNS

D2— 267 291,140
314 291,141
291,142
291,143
291,144
317 291,145
320 291,146
291,147
D3— 7 291,148
48 291,149
291,150
100 291,151
D4— 122 291,152
D6— 312 291,153
323 291,154
335 291,155
338 291,156
362 291,158
366 291,159
291,160
370 291,161
373 291,157
381 291,167
430 291,162
291,163
465 291,164
291,165
476 291,166
D7— 70 291,168
105 291,169
143 291,170
152 291,171
387 291,172
D8— 36 291,173
38 291,174
327 291,175
380 291,176
395 291,177
D9— 345 291,178
371 291,179
405 291,180
428 291,181
433 291,182
454 291,183
455 291,184
D10— 81 291,185
128 291,186
D12— 111 291,187
126 291,188
291,189
160 291,190
190 291,191
291,192
300 291,193
327 291,194
D14— 1 291,195
5 291,196
36 291,197
291,198
64 291,199
65 291,200
100 291,201
113 291,202
291,254
114 291,203
291,204
D16— 14 291,205
111 291,206
124 291,207
D18— 12 291,208
D19— 26 291,209
D20— 43 291,210
D21— 25 291,212
31 291,213
76 291,214
80 291,211
87 291,215
90 291,216
108 291,217
121 291,218
123 291,219
143 291,220
159 291,221
212 291,222
D22— 123 291,223
291,224
291,225
291,226
149 291,227
291,228
D23— 19 291,229
291,230
21 291,231
23 291,232
291,234
291,235
25 291,233
291,236
28 291,237
29 291,238
31 291,239
32 291,240
291,241
150 291,242
162 291,243
D24— 17 291,244
291,245
26 291,246
27 291,247
33 291,248
D25— 73 291,249
75 291,250
291,251
D26— 29 291,252
291,253
116 291,255
D29— 16 291,256
D30— 3 291,257
D32— 40 291,258
45 291,259

STATUTORY INVENTION REGISTRATIONS

40— 453 H317
89— 37.16 H319
137— 13 H316
198— 446 H318
206— 523 H314
333— 239 H321
356— 125 H315
364— 468 H320
372— 29 H322

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : Re.32,467
4,683,593
4,683,854
4,684,080
4,684,107
04 : 4,683,603
4,683,637
4,683,641
4,683,757
4,683,875
4,684,231
4,684,321
4,684,620
4,684,885
4,685,005
4,685,055
4,685,083
4,685,103
4,685,130
05 : 4,683,990
4,685,127
06 : Re.32,468
4,683,597
4,683,610
4,683,614
4,683,633
4,683,645
4,683,662
4,683,670
4,683,671
4,683,683
4,683,696
4,683,730
4,683,739
4,683,750
4,683,755
4,683,763
4,683,770
4,683,773
4,683,781
4,683,783
4,683,793
4,683,798
4,683,812
4,683,820
4,683,867
4,683,869
4,683,876
4,683,878
4,683,881
4,683,882
4,683,884
4,683,893
4,683,894
4,683,902
4,683,904
4,683,929
4,683,946
4,683,981
4,683,988
4,684,014
4,684,015
4,684,019
4,684,023
4,684,061
4,684,081
4,684,082
4,684,097
4,684,127
4,684,131
4,684,159
4,684,167
4,684,204
4,684,215
4,684,245
4,684,248
4,684,258
4,684,264
4,684,277
4,684,289
4,684,304
4,684,332
4,684,340
4,684,348
4,684,363
4,684,365
4,684,368
4,684,373
4,684,419
4,684,424
4,684,482
4,684,508
4,684,510
4,684,524
4,684,579
4,684,581
4,684,612
4,684,615
4,684,623
4,684,624
4,684,625
4,684,675
4,684,714
4,684,723
4,684,751
4,684,759
4,684,800
4,684,807
4,684,815
4,684,820
4,684,823
4,684,826
4,684,830
4,684,831
4,684,844
4,684,850
4,684,858
4,684,863
4,684,874
4,684,880
4,684,886
4,684,891
4,684,894
4,684,898
4,684,903
4,684,913
4,684,921
4,684,937
4,684,958
4,684,975
4,684,990
4,685,007
4,685,016
4,685,025
4,685,056
4,685,058
4,685,084
4,685,085
4,685,090
4,685,095
4,685,099
4,685,107
4,685,109
4,685,110
4,685,111
4,685,133
4,685,136
08 : 4,683,789
4,683,865
4,683,943
4,683,949
4,683,968
4,684,059
4,684,102
4,684,259
4,684,798
4,684,848
4,684,929
4,684,952
4,684,964
4,684,967
4,684,980
4,685,029
4,685,097
09 : 4,683,772
4,683,864
4,684,050
4,684,052
4,684,083
4,684,196
4,684,201
4,684,271
4,684,281
4,684,320
4,684,326
4,684,367
4,684,390
4,684,455
4,684,479
4,684,534
4,684,538
4,684,618
4,684,735
4,684,747
4,684,788
4,684,790
4,684,811
4,684,828
4,684,855
4,684,902
4,685,101
10 : 4,684,393
4,684,395
4,684,453
4,684,526
4,684,551
4,684,568
4,684,704
12 : 4,683,598
4,683,613
4,683,652
4,683,655
4,683,687
4,683,724
4,683,895
4,683,923
4,684,055
4,684,092
4,684,114
4,684,133
4,684,165
4,684,170
4,684,323
4,684,372
4,684,429
4,684,783
4,684,834
4,684,933
4,684,955
4,685,022
4,685,080
13 : 4,683,618
4,684,062
4,684,195
4,684,868
4,684,919
4,684,950
15 : 4,683,880
16 : 4,684,273
17 : 4,683,594
4,683,617
4,683,632
4,683,661
4,683,703
4,683,719
4,683,722
4,683,915
4,683,984
4,683,985
4,683,991
4,684,000
4,684,004
4,684,011
4,684,020
4,684,022
4,684,030
4,684,036
4,684,039
4,684,179
4,684,194
4,684,205
4,684,310
4,684,344
4,684,412
4,684,462
4,684,485
4,684,516
4,684,533
4,684,590
4,684,674
4,684,677
4,684,767
4,684,787
4,684,873
4,684,884
4,685,028
4,685,037
4,685,066
4,685,116
4,685,118
4,685,129
18 : 4,683,595
4,683,686
4,683,714
4,683,775
4,683,776
4,683,839
4,684,076
4,684,101
4,684,155
4,684,202
4,684,544
4,684,600
4,684,643
4,684,686
4,684,748
4,684,779
4,684,786
4,684,837
4,684,870
4,684,877
4,684,912
19 : 4,683,815
4,683,934
4,684,410
20 : 4,683,698
4,684,001
4,684,331
4,684,630
4,683,919
21 : 4,685,067
22 : 4,683,691
4,683,720
4,683,729
4,683,965
4,684,306
4,684,707
4,684,945
23 : 4,684,138
4,685,017
24 : 4,683,636
4,683,822
4,683,825
4,683,897
4,684,287
4,684,346
4,684,530
4,684,598

4,684,774
4,684,792
4,684,904
4,684,905
4,685,068
25 : 4,683,602
4,683,731
4,683,782
4,683,791
4,683,792
4,683,890
4,683,910
4,683,938
4,683,953
4,684,027
4,684,111
4,684,135
4,684,185
4,684,189
4,684,328
4,684,467
4,684,557
4,684,570
4,684,583
4,684,586
4,684,587
4,684,588
4,684,609
4,684,685
4,684,729
4,684,769
4,684,777
4,684,781
4,684,796
4,684,888
4,684,897
4,684,915
4,684,949
4,684,954
4,684,961
4,684,965
4,684,971
4,685,003
4,685,013
4,685,031
4,685,032
4,685,057
4,685,082
4,685,088
4,685,108
4,685,114
4,685,124
26 : 4,683,596
4,683,622
4,683,629
4,683,668
4,683,681
4,683,701
4,683,737
4,683,743
4,683,747
4,683,758
4,683,761
4,683,780
4,683,797
4,683,801
4,683,831
4,683,891
4,683,912
4,683,917
4,683,927
4,683,939
4,683,945
4,683,971
4,683,974
4,683,975
4,683,977
4,683,980
4,683,992
4,683,999
4,684,003
4,684,048
4,684,067
4,684,072
4,684,077
4,684,105
4,684,110
4,684,151
4,684,153
4,684,166
4,684,174
4,684,267
4,684,280
4,684,284
4,684,300
4,684,352
4,684,358
4,684,370

4,684,378
4,684,382
4,684,388
4,684,389
4,684,394
4,684,398
4,684,432
4,684,459
4,684,470
4,684,505
4,684,610
4,684,725
4,684,752
4,684,778
4,684,805
4,684,814
4,684,818
4,684,819
4,684,822
4,684,866
4,684,944
4,685,030
4,685,119
4,685,137
4,685,144
27 : 4,683,657
4,683,734
4,683,802
4,683,811
4,683,848
4,683,877
4,683,898
4,683,921
4,684,013
4,684,021
4,684,035
4,684,064
4,684,095
4,684,121
4,684,142
4,684,150
4,684,230
4,684,362
4,684,454
4,684,458
4,684,469
4,684,541
4,684,552
4,684,554
4,684,678
4,684,936
4,462,708
28 : 4,683,673
29 : 4,683,728
4,683,900
4,684,043
4,684,044
4,684,046
4,684,058
4,684,060
4,684,068
4,684,483
4,684,507
4,684,708
4,684,876
4,684,953
30 : 4,683,982
4,683,983
31 : 4,683,678
4,684,132
4,684,853
33 : 4,684,012
4,684,103
4,451,996
34 : 4,683,640
4,683,648
4,683,800
4,683,845
4,683,889
4,683,952
4,684,079
4,684,141
4,684,154
4,684,198
4,684,353
4,684,354
4,684,402
4,684,413
4,684,434
4,684,456
4,684,473
4,684,517
4,684,519
4,684,521
4,684,532
4,684,565
4,684,622
4,684,645

4,684,653
4,684,654
4,684,655
4,684,656
4,684,660
4,684,666
4,684,683
4,684,688
4,684,689
4,684,698
4,684,699
4,684,703
4,684,727
4,684,756
4,684,757
4,684,878
4,684,883
4,684,920
4,684,970
4,684,977
4,685,002
4,685,026
4,685,041
4,685,079
4,685,081
4,685,123
4,685,125
4,685,134
35 : 4,684,217
4,684,817
4,684,931
36 : 4,683,592
4,683,601
4,683,606
4,683,634
4,683,635
4,683,642
4,683,732
4,683,741
4,683,749
4,683,756
4,683,765
4,683,803
4,683,810
4,683,814
4,683,817
4,683,849
4,683,851
4,683,862
4,683,874
4,683,892
4,683,913
4,684,016
4,684,033
4,684,047
4,684,070
4,684,071
4,684,099
4,684,122
4,684,136
4,684,137
4,684,176
4,684,222
4,684,225
4,684,237
4,684,238
4,684,240
4,684,241
4,684,242
4,684,243
4,684,247
4,684,294
4,684,299
4,684,327
4,684,339
4,684,359
4,684,364
4,684,384
4,684,403
4,684,436
4,684,437
4,684,440
4,684,446
4,684,474
4,684,475
4,684,511
4,684,528
4,684,542
4,684,545
4,684,547
4,684,558
4,684,593
4,684,596
4,684,597
4,684,599
4,684,602
4,684,604
4,684,605

4,684,606
4,684,607
4,684,608
4,684,617
4,684,628
4,684,635
4,684,636
4,684,637
4,684,669
4,684,670
4,684,681
4,684,682
4,684,696
4,684,784
4,684,795
4,684,821
4,684,824
4,684,867
4,684,930
4,684,983
4,684,995
4,684,996
4,685,000
4,685,001
4,685,024
4,685,040
4,685,071
4,685,126
4,685,145
4,226,728
37 : 4,683,615
4,683,700
4,683,753
4,684,383
4,684,569
4,684,802
4,685,020
38 : 4,684,160
4,062,141
39 : 4,683,607
4,683,623
4,683,679
4,683,709
4,683,736
4,683,768
4,683,805
4,683,824
4,683,930
4,683,933
4,683,936
4,684,007
4,684,025
4,684,094
4,684,106
4,684,188
4,684,190
4,684,207
4,684,246
4,684,266
4,684,279
4,684,309
4,684,334
4,684,338
4,684,376
4,684,418
4,684,420
4,684,431
4,684,441
4,684,490
4,684,518
4,684,562
4,684,575
4,684,584
4,684,668
4,684,715
4,684,765
4,684,806
4,684,835
4,684,836
4,684,854
4,684,875
4,684,895
4,684,927
4,685,023
4,685,046
4,685,061
4,685,072
4,685,148
40 : 4,683,826
4,683,954
4,683,955
4,684,041
4,684,108
4,684,145
4,684,152
4,684,357
4,684,760

4,684,789
4,685,140
41 : 4,683,677
4,683,706
4,683,969
4,684,126
4,684,302
4,684,881
42 : 4,683,608
4,683,647
4,683,676
4,683,693
4,683,744
4,683,836
4,683,906
4,683,916
4,683,937
4,683,940
4,683,947
4,683,989
4,684,042
4,684,084
4,684,098
4,684,113
4,684,124
4,684,161
4,684,163
4,684,184
4,684,187
4,684,191
4,684,192
4,684,200
4,684,211
4,684,312
4,684,399
4,684,400
4,684,401
4,684,491
4,684,495
4,684,496
4,684,497
4,684,498
4,684,499
4,684,500
4,684,501
4,684,502
4,684,503
4,684,504
4,684,514
4,684,539
4,684,540
4,684,550
4,684,559
4,684,582
4,684,595
4,684,621
4,684,646
4,684,672
4,684,692
4,684,697
4,684,710
4,684,716
4,684,722
4,684,762
4,684,764
4,684,872
4,684,887
4,684,982
4,684,989
4,685,049
4,685,052
44 : 4,685,019
45 : 4,683,843
4,683,901
4,684,164
4,684,178
4,684,379
4,684,573
4,684,627
47 : 4,683,866
4,684,087
4,684,512
48 : 4,683,672
4,683,682
4,683,726
4,683,813
4,683,832
4,683,883
4,683,908
4,683,911
4,683,924
4,683,944
4,683,948
4,683,951
4,683,956
4,683,962
4,683,963

4,683,994
4,684,045
4,684,182
4,684,244
4,684,288
4,684,361
4,684,415
4,684,427
4,684,447
4,684,472
4,684,576
4,684,619
4,684,667
4,684,687
4,684,693
4,684,700
4,684,701
4,684,801
4,684,810
4,684,812
4,684,918
4,684,934
4,684,941
4,684,947
4,685,042
4,685,047
4,685,070
4,685,078
4,685,086
4,685,087
4,685,089
4,685,091
4,685,104
4,685,120
4,685,128
4,685,135
4,685,143
4,391,949
49 : 4,684,129
4,684,423
4,685,106
4,685,132
50 : 4,683,868
4,684,283
51 : 4,683,669
4,683,745
4,683,809
4,683,818
4,683,922
4,684,156
4,684,349
4,684,409
4,684,924
4,685,065
4,685,074
53 : 4,683,684
4,683,767
4,683,886
4,683,887
4,683,888
4,684,085
4,684,162
4,684,442
4,684,513
4,684,761
4,684,813
4,684,948
4,685,149
54 : 4,683,833
4,684,465
55 : 4,683,631
4,683,663
4,683,704
4,683,705
4,683,738
4,683,748
4,683,942
4,684,040
4,684,063
4,684,123
4,684,134
4,684,172
4,684,254
4,684,308
4,684,336
4,684,433
4,684,439
4,684,484
4,684,486
4,684,580
4,684,589
4,684,733
4,684,772
4,684,803
4,684,917
56 : 4,683,692
4,684,314

01 :	291,227		291,150	21 :	291,221		291,228		291,163		291,160
02 :	291,193		291,243	24 :	291,158		291,257		291,218		291,247
06 :	291,166	12 :	291,157		291,206	29 :	291,165		291,220	44 :	291,148
	291,169		291,168		291,248	34 :	291,250		291,249	45 :	291,201
	291,184		291,181	25 :	291,187		291,251	41 :	291,141		291,231
	291,185	17 :	291,177		291,256	36 :	291,170		291,142		291,258
	291,194		291,203	26 :	291,164		291,173		291,143	48 :	291,155
	291,207	18 :	291,151		291,176		291,179		291,144		291,175
	291,215		291,172		291,195		291,197		291,146		291,259
	291,216		291,246		291,213		291,205		291,147	51 :	291,204
	291,253	20 :	291,154	27 :	291,188		291,242		291,200	53 :	291,244
	291,255		291,212		291,189	39 :	291,162	42 :	291,149		291,245
08 :	291,145										

STATUTORY INVENTION REGISTRATIONS

01 :	H314		H322	24 :	H320						
06 :	H319	12 :	H317		H321	34 :	H316	37 :	H318	39 :	H315

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